ORDER NO. VKD83070768C8

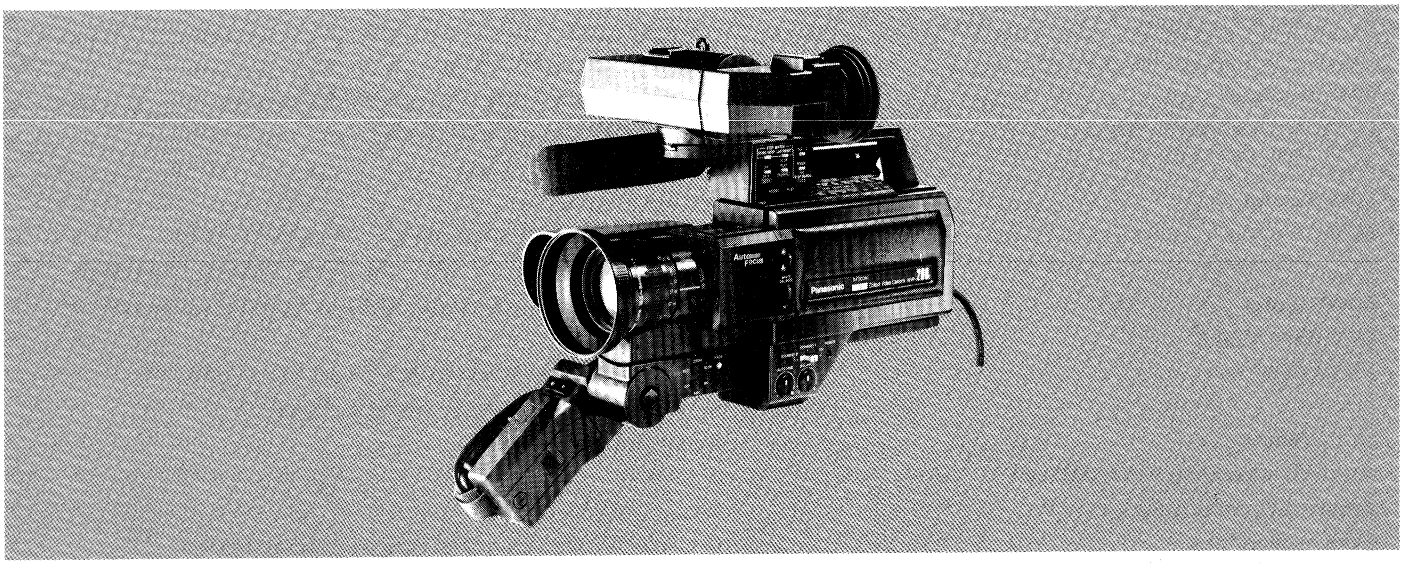
Service Manual

Vol. 1

Circuit Description

Colour Video Cameras

WVP-200E/WVP-200N



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National/Panasonic

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

SPECIFICATION

CAMERA WVP-200 Series

Power Source : 12V DC

Power Consumption : Approx. 5.5 Watts (Approx. 1.2 Watts at STANDBY 1, Approx. 0.3 Watts at STANDBY 2)

Scanning : 625 lines/50 fields/25 frame per second

Pick-up System : Single tube frequency separation system

Pick-up Tube : One high-band (5MHz) 2/3" integral stripe filter electrostatic focus, magnetic deflection, separate mesh SATICON™ tube

Video Output Level : 1.0 Vpp PAL composite/75 ohms

Horizontal Resolution (Luminance) : 350 lines at center

Single to Noise Ratio (Luminance) : 46 dB AGC OFF

Illumination Required : 1400 lux

Required Minimum Illumination : 25 lux at F1.4 (AGC ON)

Microphone : Unidirectional Electret Condencer Microphone

External Microphone Input : −72 dB 600 ohms unbalance M3 Jack

Audio Output : −20 dB/High Impedance

Earphone Output : 8 ohms M3 Jack

Lens : Auto Focus Lens 8:1 Automatic Light/Iris Control, Power zoom ; 10.5 - 84 mm F1.4, Filter Diameter / ϕ 58mm

Zoom Speed : FAST : Approx. 7.5 seconds, SLOW : Approx. 12 seconds

Lens Mounting : Bayonet

Viewfinder : 1.5" Electric Viewfinder (actual visual size 1-3/8", measured diagonally) with graphics display

White Balance : Automatic Control

Ambient Operating Temperature : 0°C-40°C

Ambient Operating Humidity : Less than 90%

Camera Mounting : One 1/4"-20 threaded hole standard camera tripod

Dimension : 200(W) x 230(H) x 308(D) mm

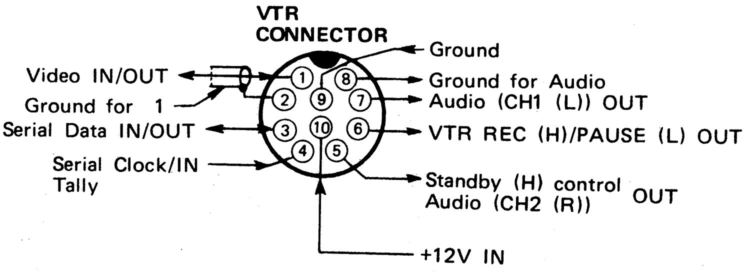
7-7/8"(W) x 9-1/16"(H) x 12-1/8"(D)

Weight : 2.0 kg (4.4 lbs)

STANDARD ACCESSORIES

● Lens Cap	1 pc
● Accessory Shoe Adaptor	1 pc
● Battery (UM3NE)	1 pc
● Carrying Case .... (WVP-200N/A only)	1 pc

VTR CABLE SIGNAL INFORMATION


VTR CONNECTOR
Ground
Ground for Audio
Audio (CH1 (L)) OUT
VTR REC (H)/PAUSE (L) OUT
Standby (H) control OUT
Audio (CH2 (R)) OUT
+12V IN
Video IN/OUT
Ground for 1
Serial Data IN/OUT
Serial Clock/IN
Tally
1
2
3
4
5
6
7
8
9
10

1 Principle of Single Carrier Frequency Multiplexing System using a Single Tube.

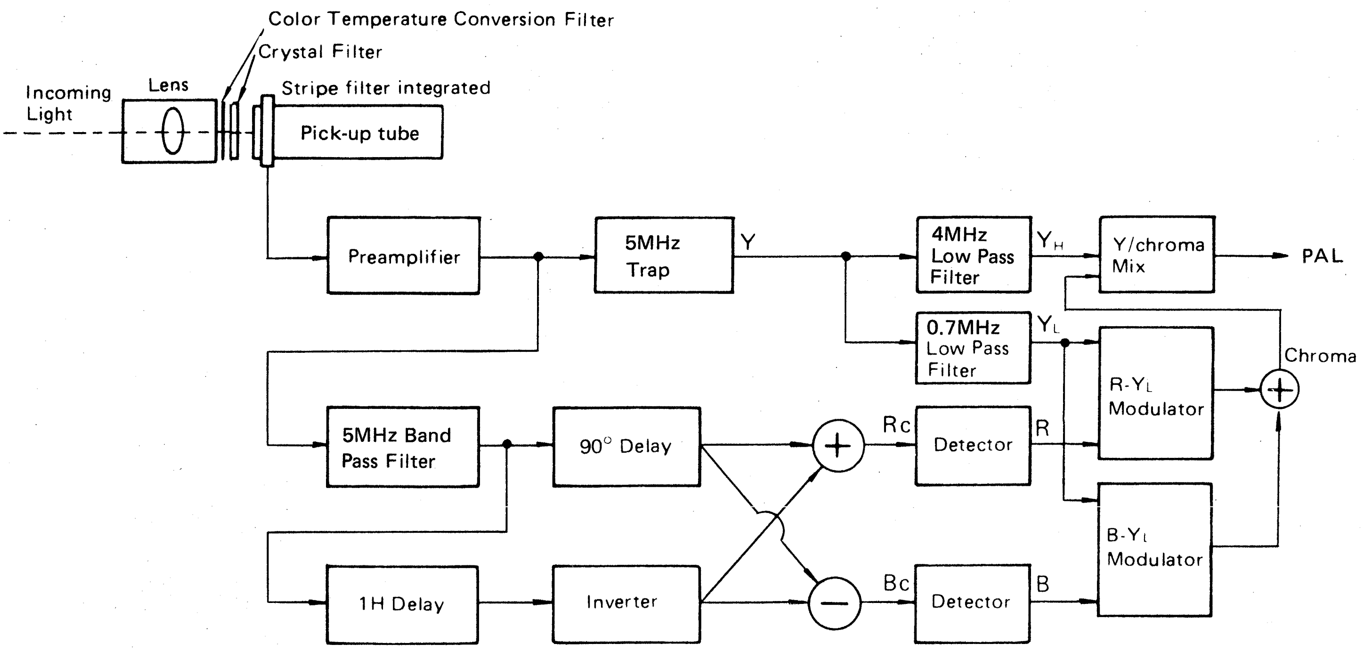

Color Temperature Conversion Filter
Crystal Filter
Incoming Light
Lens
Stripe filter integrated
Pick-up tube
Preamplifier
5MHz Trap
Y
4MHz Low Pass Filter
Y_H
Y/chroma Mix
PAL
0.7MHz Low Pass Filter
Y_L
Chroma
R-Y_L Modulator
5MHz Band Pass Filter
90° Delay
Rc
Detector
R
B-Y_L Modulator
1H Delay
Inverter
Bc
Detector
B

Fig. 1-1 Principle of Single Carrier Frequency Multiplexing System using a Single Tube

The incoming light to the camera which passes through the automatic iris control(AIC) lens, the color temperature conversion filter, and the crystal filter reaches the surface of the integrated stripe filter in a 2/3" pick-up tube (SATICONTM) (YFH4151KIT).
The diffusion filter is inserted between the AIC lens and the color temperature conversion filter when the white balance switch is set to SET position.

Color Temperature Conversion Filter

Generally, the human eye is sensitive to electromagnetic waves from 380mμ(mμ=nm) to 780mμ in wavelength (the visible region). (Fig. 1-2)
In addition, the human eye also discerns the wavelength difference as a color difference. The human eye responds to the light between 400mμ to 500mμ wavelength as predominantly blue information, the light between 500mμ to 600mμ as green information, and the light between 600mμ to 700 mμ as red information. The entire light in the "visible" range of wavelength from 380mμ to 780mμ is "seen "as different amount of white light.

When a carbon is burned, it emits light of a different quality depending on how hot it is. Various natural light can be expressed in terms of a color temperature which may be referred to a light emitted from the burning carbon used as a standard. A light source of 3200°K (K=Kelvin: -273°C corresponds to 0°K an absolute temperature) color temperature, which is used in studios, implies that its quality (color) is the same as that emitted from the carbon burning at 3200°K (2927°C).
The relationship between the color temperature of light sources used for illumination and weather conditions are shown in Fig. 1-4. The color temperature goes up as the weather turns overcast from clear. This may be related to the burning carbon(charcoal) as follows. When the charcoal is heated and begins to glow (at low temperature), it emits a reddish light. But when it is so-called white hot (at high temperature), a bluish light is emitted. In other words, the light at a low color temperature is considered reddish and at high color temperature is considered bluish.

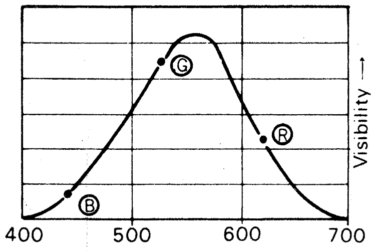


Fig. 1-2 Standard Luminosity Curve

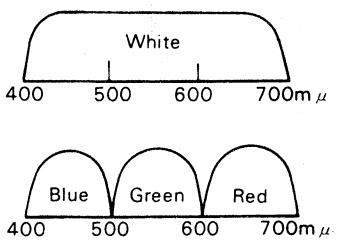

White
400
500
600
700mμ
Blue
Green
Red
400
500
600
700mμ

Fig. 1-3 The Visible Spectrum

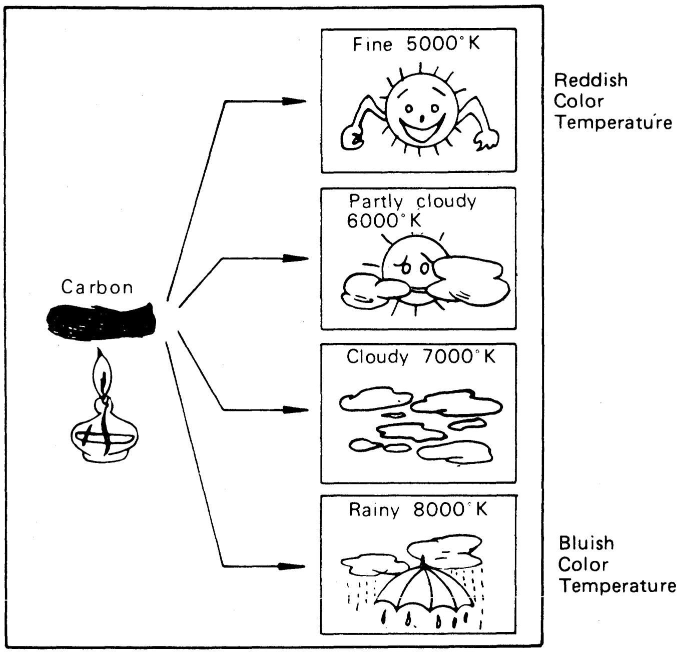


Fig. 1-4 Color Temperature and Weather Conditions

When a color camera is pointed at an object illuminated by a light of low color temperature, it reproduces a reddish picture. When a color camera is pointed at an object illuminated by a light of high color temperature, it reproduces a bluish picture.

The color camera has the indoor-outdoor selection switch which corrects for the color temperature of the light. When the switch is set to the outdoor position, the 5500°K COLOR TEMPERATURE CONVERSION FILTER is inserted into the light path to convert the color temperature from 5500°K to 3200°K.

In addition to the indoor-outdoor selection switch utilizing the color temperature conversion filter, this camera is designed so that the level of red and blue signals can be changed independently to meet the color temperature of the light source in order to ensure proper color reproduction.

Crystal Filter

As described later, since the red and blue images are modulated by the fine stripe filter built into the pick-up tube, false signals could develop due to interference between the stripe filters and fine detail objects. The crystal filter is an optical low pass filter which prevents the occurrence of such false signals by blocking the high frequency components of images.

Diffusion Filter

When the white balance switch is set to SET position, the diffusion filter is inserted between the lens and the color temperature conversion filter to diffuse the incoming light, and the whitish light reaches the pick-up tube.

Pick-up Tube

Different from that of the black and white camera, the pick-up tube used in this color camera has a built-in stripe filter, a metallic stripe called the optical black(OB) located on the face-plate. The video signals black level is set in reference to the signal from the optical black.

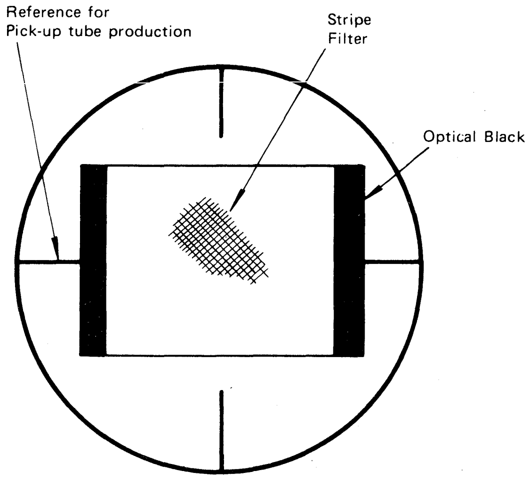


Fig. 1-5 Front View of Pick-up Tube

As shown in Fig.1-8 Ⓑ , the stripe filter integrated into the pick-up tube consists of a cyan/transparent stripe filter section and a yellow/transparent stripe filter section. These stripe filters are so arranged as to be of the same pitch in the horizontal scanning direction, and have equal angles with respect to the vertical. The pick-up tubes even and odd scanning lines pass the tracks of the stripe filters that are arranged in the same way. In other words, the even and odd scanning lines are spaced "a" part.

For easy understanding, let's assume that light of uniform level containing green(G), red(R), and blue(B) reaches the pick-up tube(Fig. 1-8 Ⓐ), and that the crosspoint of cyan and yellow stripe filter is scanned as shown in Fig. 1-8 Ⓑ .

Let's consider the light output from the stripe filter. The cyan filter cuts off the red(R) light which is complementary to it, and the yellow filter cuts off the blue(B) light which is complementary to it. (Fig. 1-6).

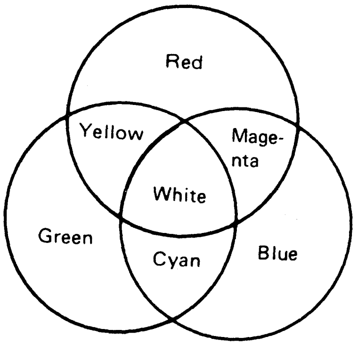


Fig. 1-6 Complementary Color

The light output Ⓒ, which corresponds to the Nth scanning line contains the modulated R and B components, riding on top of unmodulated G component. The light output Ⓓ, which corresponds to the N+1st scanning line contains the modulated R and B components, riding on top of the unmodulated G components. Light output Ⓔ, Ⓕ, and Ⓖ correspond to N+2nd, N+3rd and N+4th scanning lines respectively. The light Ⓒ for the Nth line and the light Ⓖ for the N+4th line are exactly same.

The stripe filters have the same pitch in the horizontal scanning direction, and the same angle in the vertical directions so that there is a phase difference of 90° among modulated components.

The pick-up tube produces the video signal whose waveform is the same as the that of the light which comes from the stripe filter.

The modulation frequency for the R and B signals can be calculated from the following equation.

$$f = \frac{w \times 10^3}{p \times t} \quad \text{(MHz)}$$

Here, f : Modulation frequency (MHz)

W : Horizontal width of effective scanning area of pick-up tube (mm)

p : Stripe filter pitch (μm)

t : Horizontal video signal duration (line duration (1H)—horizontal blanking duration (H.BL)) (μs)

Specially;

$W = 8.39\text{mm}$

$p = 32.29\ \mu\text{m}$

$t = 1H - H.BL = 64 - 12.03 = 51.97\mu s$

$$f = \frac{w \times 10^3}{p \times t} = \frac{8.39 \times 10^3}{32.29 \times 51.97} = 5\ \text{MHz}$$

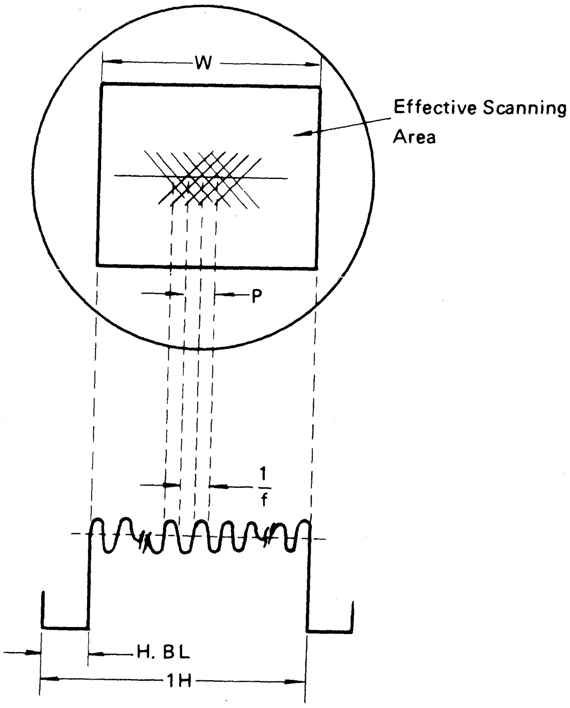


Fig. 1-7 Modulation Frequency

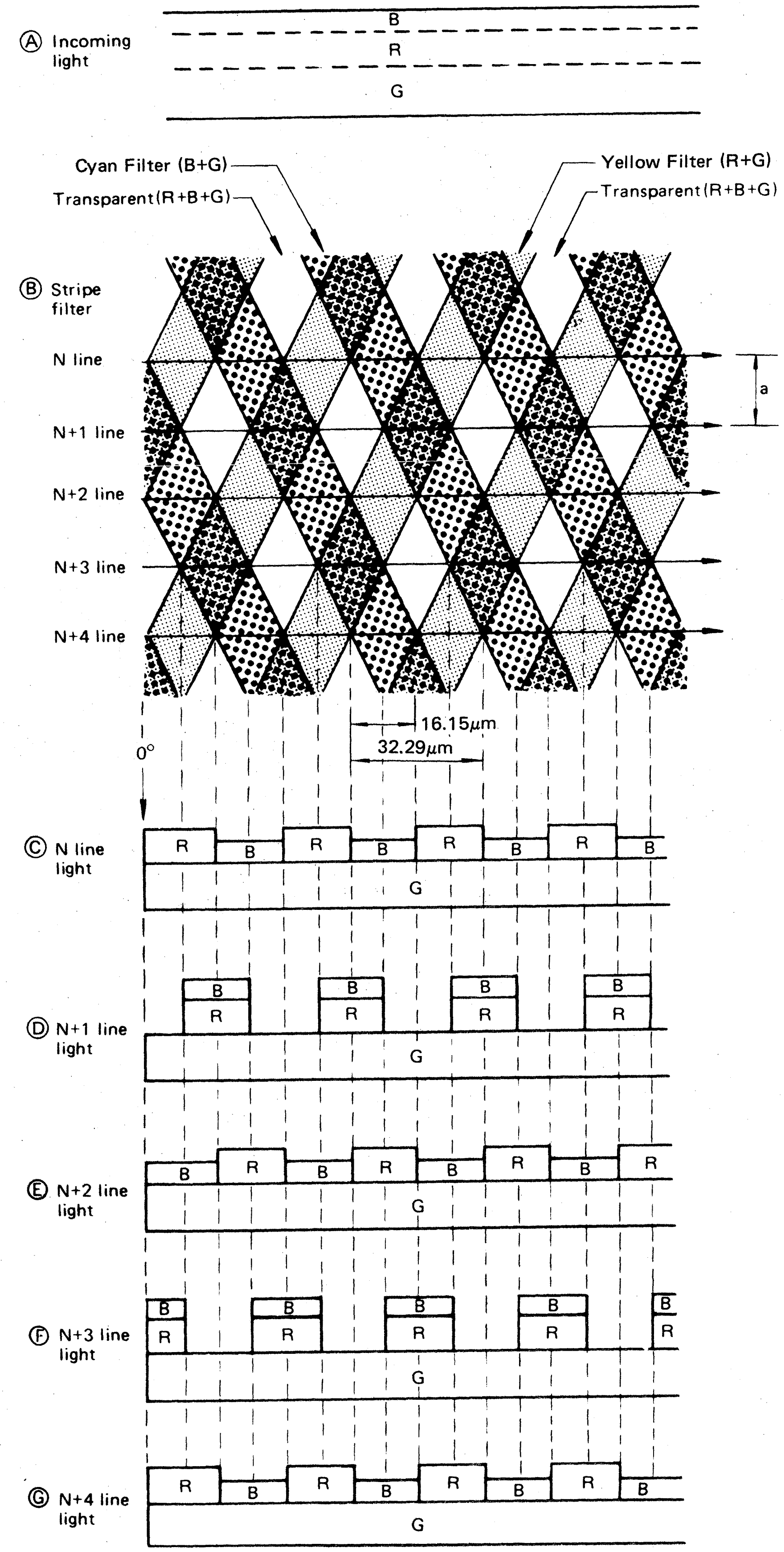

Ⓐ Incoming light
B
R
G
Cyan Filter (B+G)
Transparent(R+B+G)
Yellow Filter (R+G)
Transparent(R+B+G)
Ⓑ Stripe filter
N line
N+1 line
N+2 line
N+3 line
N+4 line
a
16.15µm
32.29µm
0°
Ⓒ N line light
R B R B R B R B
G
Ⓓ N+1 line light
B R B R B R B R
G
Ⓔ N+2 line light
B R B R B R B R
G
Ⓕ N+3 line light
B R B R B R B R B R
G
Ⓖ N+4 line light
R B R B R B R B
G

Fig. 1-8 Light from Stripe Filter

The incoming light is thus converted by the integrated stripe filter into a signal which contains R and B signals modulated by 5MHz, and the G signal.

This signal is sent to the preamplifier, where it is amplified. The amplified signal Ⓗ (see Fig. 1-10) from preamplifier is sent to the 5MHz trap circuit, which passes only the luminance(Y) signal Ⓘ comprising the G signal and the mean value of the modulated R and B signals. The mean value of modulated R and B signals on adjacent scanning lines are equal so that the luminance signal corresponding to two successive lines is also equal (see Fig. 1-9) due to the characteristics of the trap circuit.

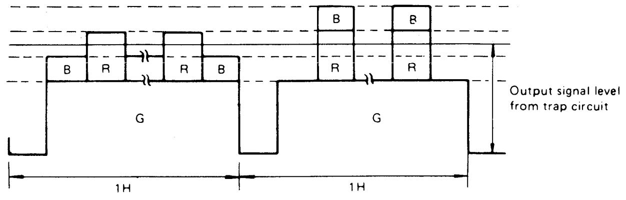

B
R
R
B
B
B
R
R
G
G
Output signal level from trap circuit
1H
1H

Fig. 1-9 Detection of Y signal

The Y signal thus obtained is supplied to the 4MHz low pass filter and the 0.7MHz low pass filter. The luminance(Y_H) signal having high frequency response and the luminance signal (Y_L) having low frequency response come out from these low pass filters.

The Y_H signal is supplied to the Y/chroma mix circuit and the Y_L signal to the R-Y_L and B-Y_L modulator circuits.

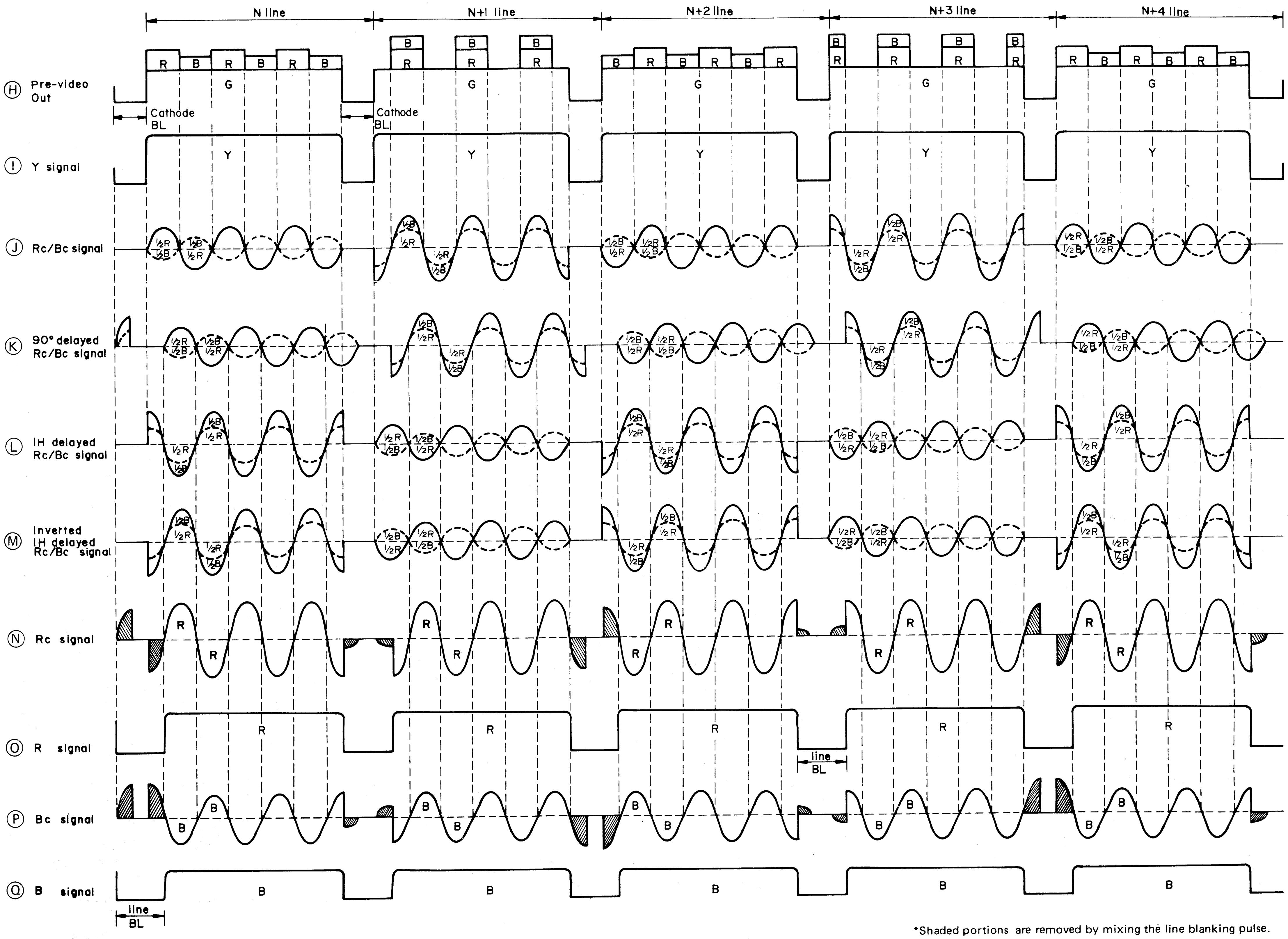
The amplified signal Ⓗ is also supplied to the band-pass-filter (B.P.F.) whose center frequency is 5MHz and through which only the 5MHz modulated signal Ⓙ passes.

The modulated signal Ⓙ is sent to the 90° phase shift circuit and the 1H(1 line) delay circuit, from which 90° phase shifted and 1H delayed modulated signals Ⓚ and Ⓛ are obtained.

The 1H-delayed modulated signal Ⓛ is inverted and the signal Ⓜ is obtained. The modulated R(Rc) signal Ⓝ is obtained by adding the modulated signals Ⓚ and Ⓜ, and the modulated B(Bc) signal Ⓟ is obtained by subtraction of the modulated signals Ⓚ and Ⓜ. The shaded portions on the signals Ⓝ and Ⓟ are removed by mixing the line blanking pulse.

The Rc and Bc signals obtained by addition and subtraction are supplied to detectors, from which R signal Ⓞ and B signal Ⓠ are obtained. The R signal and B signal thus obtained are fed to the R-Y_L and B-Y_L modulator circuits respectively.

The chrominance signal obtained by mixing the R-Y_L and B-Y_L modulated signals is supplied to the Y/chroma mix circuit where it is mixed with the luminance(Y_H) signal to result in a PAL signal.


N line
N+1 line
N+2 line
N+3 line
N+4 line
Ⓗ Pre-video Out
Cathode BL
Ⓘ Y signal
Ⓙ Rc/Bc signal
Ⓚ 90° delayed Rc/Bc signal
Ⓛ 1H delayed Rc/Bc signal
Ⓜ Inverted 1H delayed Rc/Bc signal
Ⓝ Rc signal
Ⓞ R signal
Ⓟ Bc signal
Ⓠ B signal
R
B
G
Y
½R
½B
line BL

*Shaded portions are removed by mixing the line blanking pulse.

Fig. 1-10 Detection of Y, R and B Signals

2 Preamplifier Board (YFVPKA2002EA)

Outline

This circuit amplifies the signal current is(0.2μA-0.3μA) from the pick-up tube.
The amplified video signal is delivered to the Signal Processing circuit on the Process board.
The preamplifier is a low output impedance and negative feedback amplifier which uses a low noise FET at the input.
To maintain the low noise in the signal, a so-called Percival circuit is used. It improves the S/N ratio at relatively high frequencies (where color components are located).

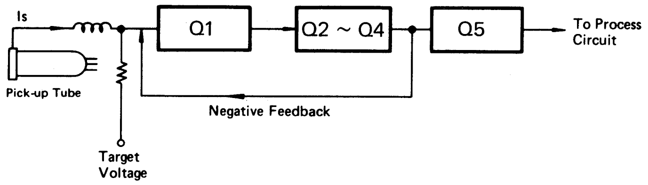

Is
Q1
Q2 ~ Q4
Q5
To Process Circuit
Pick-up Tube
Negative Feedback
Target Voltage

Fig. 2-1 Preamplifier

Details

The signal current from the pick-up tube, comprising the modulated red(R) and blue(B) components, and the green(G) component, is supplied to the target terminal of the Preamplifier circuit and converted to the video signal by R2 through L1 Percival coil. This video signal is amplified approx. 30dB by the amplifier which consists of Q1 FET and Q2. The amplified signal is then fed to Q3 and Q4 which amplify the input signal approx. 66dB.
The signal at the collector of Q4 is negatively fed back to the gate of Q1 through a feedback circuit which consists of R8, R12, C8 and C9.
The CT1 adjusts the frequency response of the feedback signal and corrects the frequency response of video signal.
The video signal whose frequency response is shaped by the negative feedback is converted to the low impedance video signal with the use of buffer Q5. It is then supplied to the Process board.
The target voltage for the pick-up tube is supplied from the Deflection board to terminal No. 4 (TARGET VOLTAGE IN) of the multi-pin connector BI1 through the Process board.
The target voltage, controlled due to the pick-up tube temperature drift, is supplied to the pick-up tube target through R17, R1 and L1.

Percival Circuit

The pick-up tube's output is a low noise signal, so that the video S/N is determined by the noise of the preamplifier.
The S/N of the modulated R and B signal is lower than that of the non-modulated signal G in the low frequency range due to effects of the pick-up tube output capacitance and the input capacitance of the preamplifier. Percival circuit is adopted to reduce the effects of these capaicitances and improve the S/N.
The beneficial effects of the Percival circuit are shown in Fig. 2-2. The equivalent circuit is also shown in Fig. 2-3.

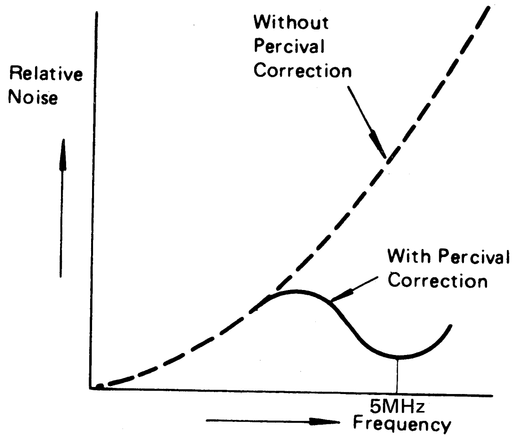


Fig. 2-2 Percival Correction

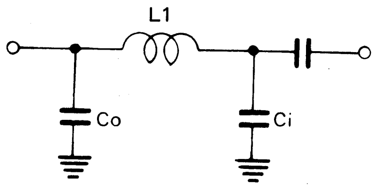


Fig. 2-3

Where : L1 ; Percival coil
Co ; Output capacitance of pick-up tube
Ci ; Input capacitance of preamp

3 Deflection Board (YFVPKA2001EA)

The Deflection Board contains following circuits.

3-1 +7.6V Regulator Circuit 9
3-2 +4.8V Regulator Circuit 10
3-3 +8.6V Regulator Circuit 10
3-4 Micro Processor Power Supply Circuit 11
3-5 Horizontal Deflection Circuit 13
3-6 Horizontal Linearity Correction Circuit 13
3-7 Vertical Deflection Circuit 14
3-8 Target Voltage Setting Circuit 15
3-9 Cathode Blanking/Beam Detect Circuit 15
3-10 Bias Light Circuit 16
3-11 High Voltage Circuit 17
3-12 EVF Video Amplifier Circuit 17
3-13 EVF Vertical Deflection Circuit 18
3-14 EVF Horizontal Oscillation Circuit 18
3-15 Standby Circuit 19
3-16 Playback Control Circuit 19

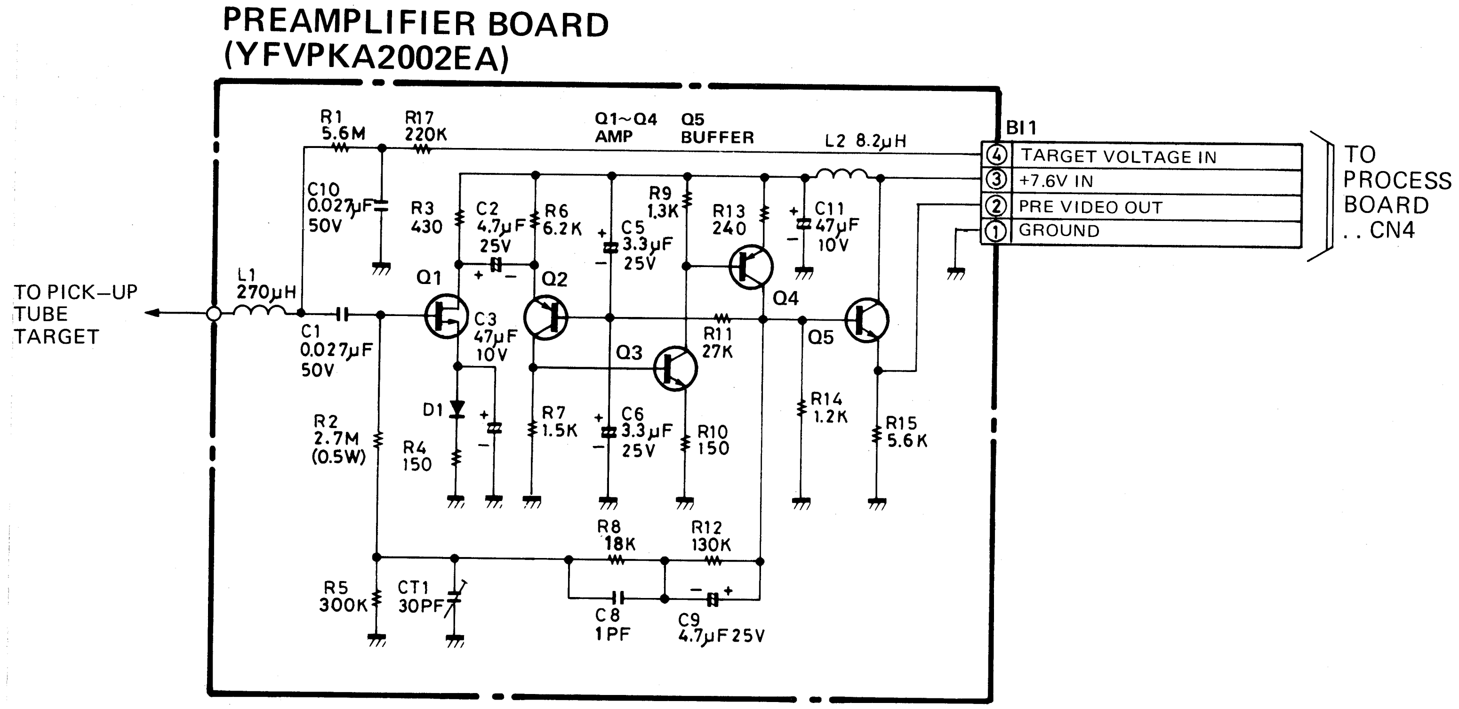

PREAMPLIFIER BOARD
(YFVPKA2002EA)
R1 5.6M
R17 220K
Q1~Q4 AMP
Q5 BUFFER
L2 8.2μH
BI1
④ TARGET VOLTAGE IN
③ +7.6V IN
② PRE VIDEO OUT
① GROUND
TO PROCESS BOARD . . CN4
C10 0.027μF 50V
R3 430
C2 4.7μF 25V
R6 6.2K
C5 3.3μF 25V
R9 1.3K
R13 240
C11 47μF 10V
TO PICK–UP TUBE TARGET
L1 270μH
C1 0.027μF 50V
Q1
C3 47μF 10V
Q2
Q3
Q4
R11 27K
Q5
D1
R2 2.7M (0.5W)
R4 150
R7 1.5K
C6 3.3μF 25V
R10 150
R14 1.2K
R15 5.6K
R8 18K
R12 130K
R5 300K
CT1 30PF
C8 1PF
C9 4.7μF 25V

Fig. 2-4 Preamplifier Circuit

3-1 +7.6V Regulator Circuit

Outline

The +7.6V regulator circuit consisting of IC1, Q1, Q2 and Q3 generates regulated +7.6V DC from +12V unregulated DC power from the portable VTR or the power supply unit.

This +7.6V regulator is a switching type regulator and the output voltage is controlled as;

+7.6V --- STANDBY switch is ON position

+5.0V --- STANDBY switch is STANDBY-1 & 2 position in order to save the battery life.

Details

The +12V DC power from the portable VTR or the power supply is applied through terminal No. 10 of VTR connector CN101 and terminal No. 2 of CN5 to the emitter of Q1 and Pin 1 of IC1 respectively.

+5V DC is generated inside IC1 and used as sub-power inside IC1.

Approx. 120KHz triangular signal is also generated in triangle oscillator (OSC) inside IC1 and fed to the switching amplifier inside IC1.

The reference DC voltage supplied to pin 11 of IC1 whose level is set by VR1 (+7.6V ADJ) and +7.6V output DC supplied to pin 10 of IC1 are compared by the error amplifier inside IC1. The error output DC voltage corresponding to the +7.6V DC voltage error and triangular signal supplied from triangle OSC are compared by the switching amplifier and the switching pulse output whose width is controlled by the error DC voltage appears at pin 9 of IC1.

This switching pulse is applied to the base of switching transistor Q1 switching ON and OFF Q1 through buffer Q2 and Q3.

As a result, the DC voltage whose level is set by the switching pulse width (pulse duty) is obtained at the output of switching regulator circuit consisting of Q1, D1 and L2. The generated DC voltage is fed back to pin 10 of IC1 to maintain constant output voltage. VR1 is a control for +7.6V output voltage.

The regulated +7.6V is then supplied to other circuits as a power through the filters consisting of L2/C6 and L3/C9.

The standby control section inside IC1 sends out either +5V DC voltage during STANDBY switch is ON position or 0V during STANDBY switch is STANDBY-1 & 2 position to pin 7 of IC1 depend upon supplied DC voltage at pin 5 of IC1 which is changed from +7.6V at ON position to 0V at STANDBY-1 and 2 position.

As a result, the +7.6V DC voltage drops to +5.0V by dropping reference voltage at pin 11 of IC1.

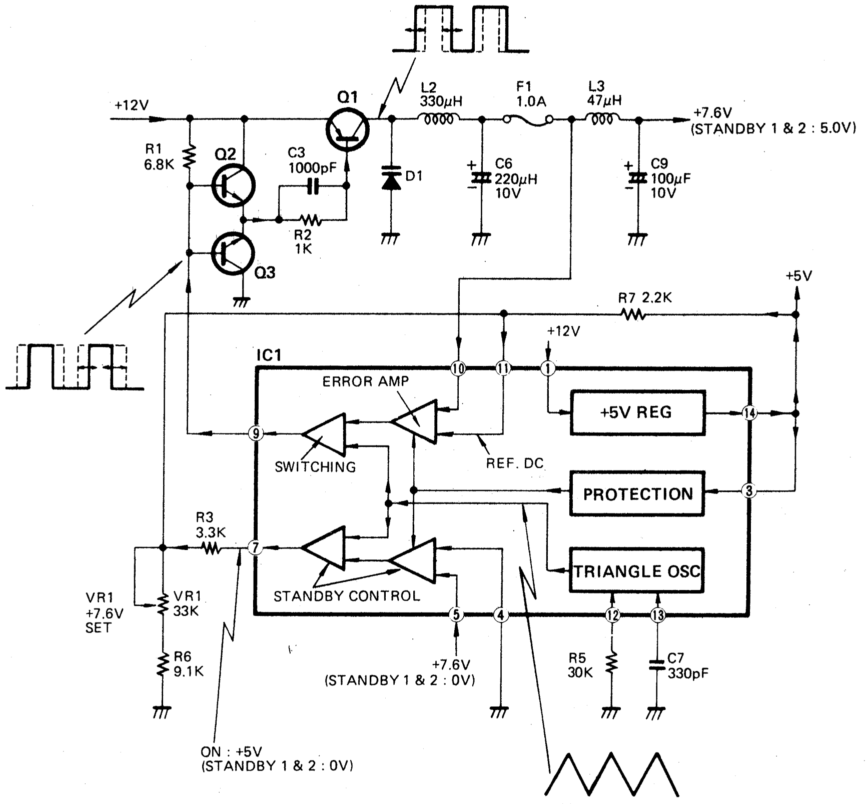

+12V
Q1
L2
330μH
F1
1.0A
L3
47μH
+7.6V
(STANDBY 1 & 2 : 5.0V)
R1
6.8K
Q2
C3
1000pF
D1
C6
220μH
10V
C9
100μF
10V
R2
1K
Q3
+5V
R7 2.2K
+12V
IC1
ERROR AMP
+5V REG
SWITCHING
REF. DC
PROTECTION
R3
3.3K
TRIANGLE OSC
STANDBY CONTROL
VR1
+7.6V
SET
VR1
33K
R6
9.1K
+7.6V
(STANDBY 1 & 2 : 0V)
R5
30K
C7
330pF
ON : +5V
(STANDBY 1 & 2 : 0V)
120KHz ~ 130KHz

Fig. 3-1 +7.6V Regulator Circuit

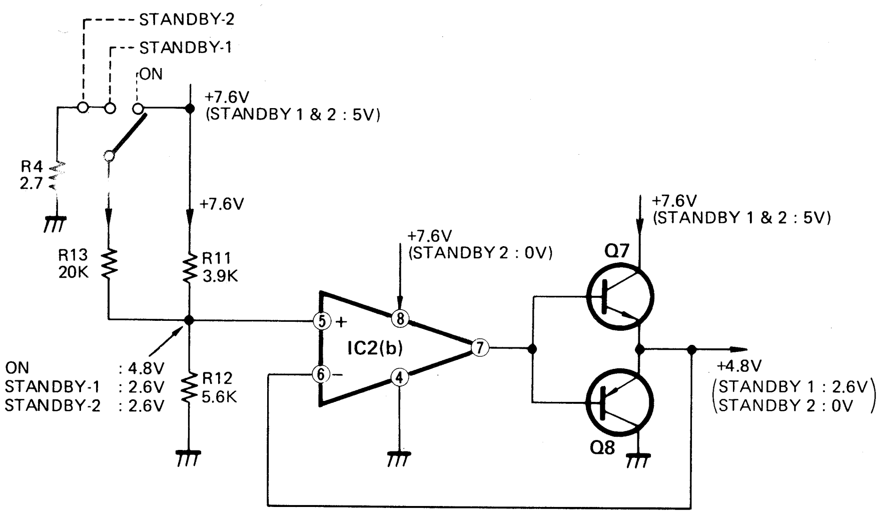

STANDBY-2
STANDBY-1
ON
+7.6V (STANDBY 1 & 2 : 5V)
R4 2.7
R13 20K
+7.6V
R11 3.9K
+7.6V (STANDBY 2 : 0V)
+7.6V (STANDBY 1 & 2 : 5V)
Q7
IC2(b)
ON : 4.8V
STANDBY-1 : 2.6V
STANDBY-2 : 2.6V
R12 5.6K
+4.8V (STANDBY 1 : 2.6V) (STANDBY 2 : 0V)
Q8

Fig. 3-2 +4.8V Regulator Circuit

3-2 +4.8V Regulator Circuit

Outline

+4.8V DC is generated by regulating +7.6V generated in the +7.6V regulator circuit.
This +4.8V is used as power supply for other circuits.
This +4.8V DC voltage also drops to either +2.6V at STANDBY-1 or 0V at STANDBY-2 for saving battery life.

Details

The +4.8V DC voltage is generated by regulating +7.6V DC power using IC2(b), Q7 and Q8.
The output voltage of Q7/Q8 is applied to pin 6 of IC2 to form a feedback loop, and thus stabilizing the output voltage. The reference voltage for pin 5 of IC2 is obtained by dividing the +7.6V using R11 and R12.
However the reference voltage drops at STANDBY-1 & 2 position caused by dropping +7.6V DC. Also power supply for IC2 (pin 8) becomes 0V at STANDBY-2 position.
As a result, +4.8V DC drops to either +2.6V at STANDBY-1 or 0V at STANDBY-2.

3-3 +8.6V Regulator Circuit

Outline

+8.6V DC voltage is generated from unregulated +12V DC power by IC4(b) and Q9 and this +8.6V is used as power supply for other circuits.
The +8.6V DC also drops to 0V at STANDBY-1 & 2.

Details

The +8.6V DC voltage is produced by IC4(b) and Q9 and obtained at the collector of Q9.
The output voltage is fed back to pin 5 of IC4 by dividing the +8.6V DC voltage using R14 and R15 for stabilizing the +8.6V DC output voltage. Also +4.8V regulated DC is supplied to pin 6 of IC4 for the reference voltage.
However, the +4.8V DC voltage is changed to 0V at STANDBY-1&2. Therefore +8.6V DC voltage is also changed to 0V at STANDBY-1&2.

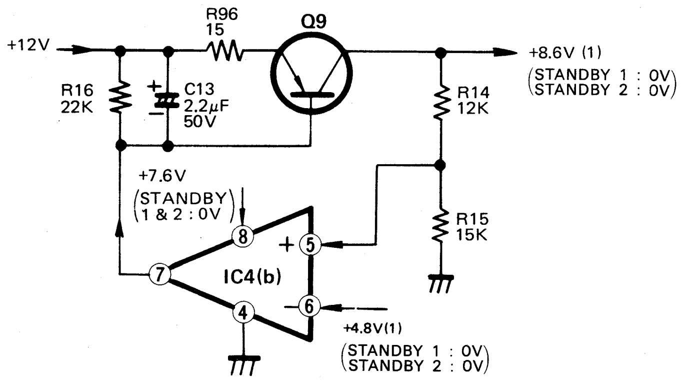

R96 15
Q9
+12V
+8.6V (1) (STANDBY 1 : 0V) (STANDBY 2 : 0V)
R16 22K
C13 2.2μF 50V
R14 12K
+7.6V (STANDBY 1 & 2 : 0V)
R15 15K
IC4(b)
+4.8V(1) (STANDBY 1 : 0V) (STANDBY 2 : 0V)

Fig. 3-3 +8.6V Regulator Circuit

3-4 Micro Processor Power Supply Circuit

Outline

This circuit consisting of Q5 and Q6 produces +5V DC voltage at the STANDBY switch is ON, +4.3V at STANDBY-1 & 2 for the power supply of the micro processor. Also, the back-up battery DC-DC converter circuit consisting of Q12, Q13 and Q40 generates approx. +3.4V DC voltage from +1.5V dry battery which called back-up battery and supplies it to the micro processor as a power source in order to maintain the calendar function of the micro processor during no +12V DC power is supplied.

The CPU reset pulse generator Q11 generates a reset pulse for the micro processor and the back-up battery warning circuit IC4(a) produces the back-up battery warning signal and sends it to micro processor board in order to indicate the back-up battery level which becomes too low.

When the new (full charged) +1.5V back-up battery is installed, the back-up battery DC-DC converter circuit may be worked up to approx. 1 year.

Details

When the STANDBY SW is placed ON position, +7.6V DC voltage is applied to the collector of Q6, +5V DC voltage is sent to the base of Q5 and +4.8V DC voltage is fed to the collector of Q5 and Q5 & Q6 turn ON. Therefore, +5V DC voltage obtained at the emitter of Q6 is sent to the micro processor as a power source. However, +7.6V DC drops to +5V when the STANDBY SW is placed STANDBY-1 & 2 and +4.8V DC drops to +2.6V at STANDBY-1 and 0V at STANDBY-2. As a result, +5V DC obtained at the emitter of Q6 drops to +4.3V at STANDBY-1 & 2.

When the +12V DC power from the VTR or power supply unit is turned OFF, the back-up battery DC-DC converter oscillates approx. 200 - 300KHz by Q13, C15, R21, T2 and the stray capacitance using +1.5V dry battery and boosts it by T2.

The boosted switching pulse obtained at pin 2 of T2 is rectified by D3 and converted it to +3.4V DC by C10. This +3.4V DC is supplied to the micro processor to maintain its calendar function during no +12V DC power is supplied.

However, the +3.4V DC voltage drifts according to the 1.5V back-up battery voltage. Therefore the voltage regulator Q12, D2, R20 and R91 controls the base bias voltage of Q13 to control the ON/OFF duty of Q13 to keep +3.4V DC voltage constant.

On the other hand, when +12V DC is supplied to the camera, +5V or +4.3V DC is fed to D2 from the emitter of Q6 and D2 & Q12 are turned ON. The base of Q13 is connected to ground by Q12, Q13 is turned OFF and oscillation is stopped.

But, when no +12V DC is supplied to camera and +1.5V back-up battery is completely discharged, the new +1.5V back-up battery is then installed, approx. 5 - 10 times more current flow to the micro processor compare to normal back-up mode due to the micro processor's characteristic. This case, the back-up battery DC-DC converter circuit can not supply the +3.4V DC to the micro processor because of small capacity of output current. Therefore, the base of Q40 is low and Q40 is turned OFF to stop the oscillation by cutting off the base bias voltage of Q13.

The Q11 generates the CPU reset pulse when the back-up battery is replaced and +12V DC power is then supplied to the camera. This case, the micro processor is reset by the CPU reset pulse. All information such as calendar, title 1, 2 and 3, automatic white balance (AWC) level etc. is cleared.

IC4(a) compares the +1.5V back-up battery voltage and the reference voltage divided +7.6V using R22 and R23. When the back-up battery voltage is higher than 1.1V, the output voltage at pin 1 of IC4 is low(L) and this is sent to micro processor board as the information of which the battery level is OK. But the back-up battery is discharged and its voltage becomes lower than 1.1V, the output of IC4 changes high(H) and this is sent to micro processor board for blinking the tape counter on the electronic viewfinder (EVF).

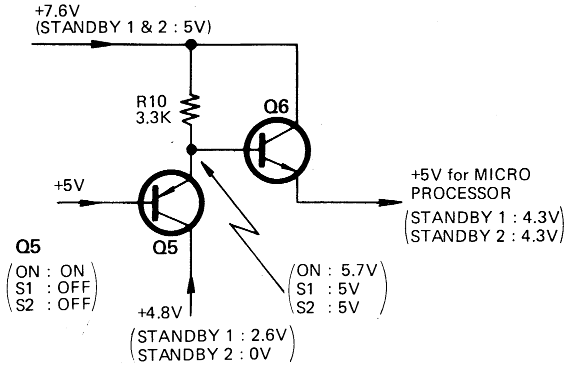

+7.6V
(STANDBY 1 & 2 : 5V)
R10
3.3K
Q6
+5V
Q5
Q5
(ON : ON
S1 : OFF
S2 : OFF)
+4.8V
(STANDBY 1 : 2.6V
STANDBY 2 : 0V)
(ON : 5.7V
S1 : 5V
S2 : 5V)
+5V for MICRO PROCESSOR
(STANDBY 1 : 4.3V
STANDBY 2 : 4.3V)

Fig. 3-4-1 Power Supply for Micro Processor

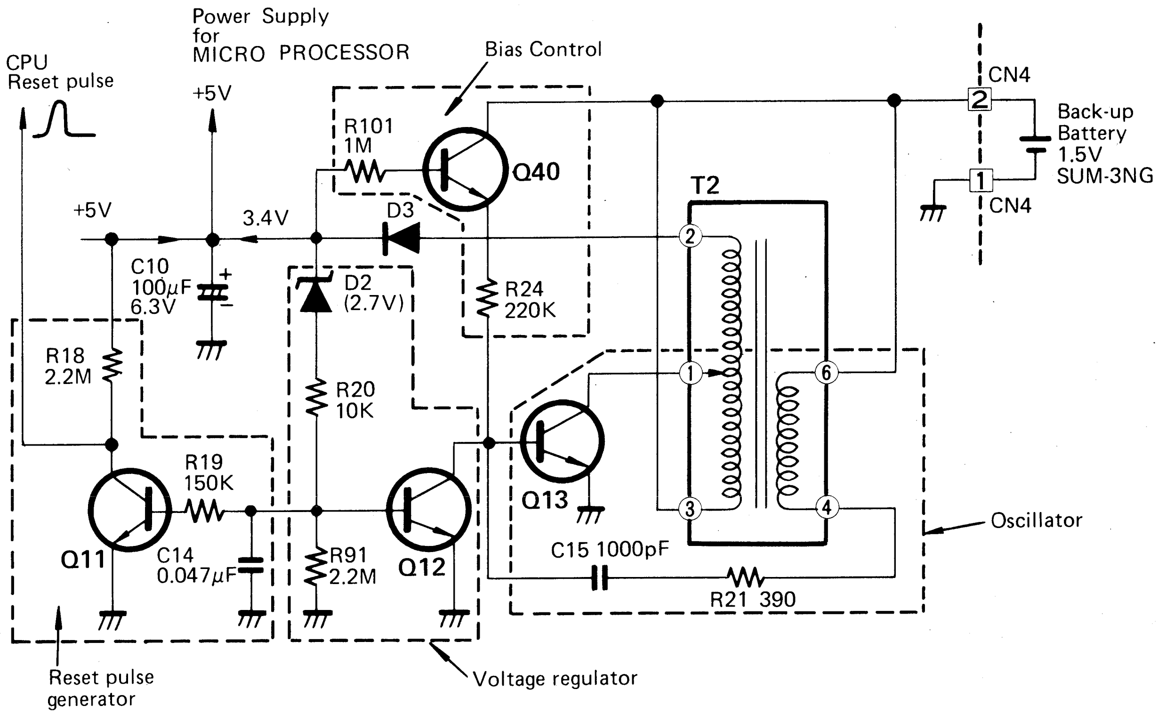

CPU
Reset pulse
Power Supply for MICRO PROCESSOR
+5V
Bias Control
CN4
Back-up Battery 1.5V SUM-3NG
CN4
R101
1M
Q40
T2
+5V
3.4V
D3
C10
100μF
6.3V
D2
(2.7V)
R24
220K
R18
2.2M
R20
10K
R19
150K
Q13
Oscillator
Q11
C14
0.047μF
R91
2.2M
Q12
C15 1000pF
R21 390
Reset pulse generator
Voltage regulator

Fig. 3-4-2 Back-up Battery DC-DC Converter Circuit

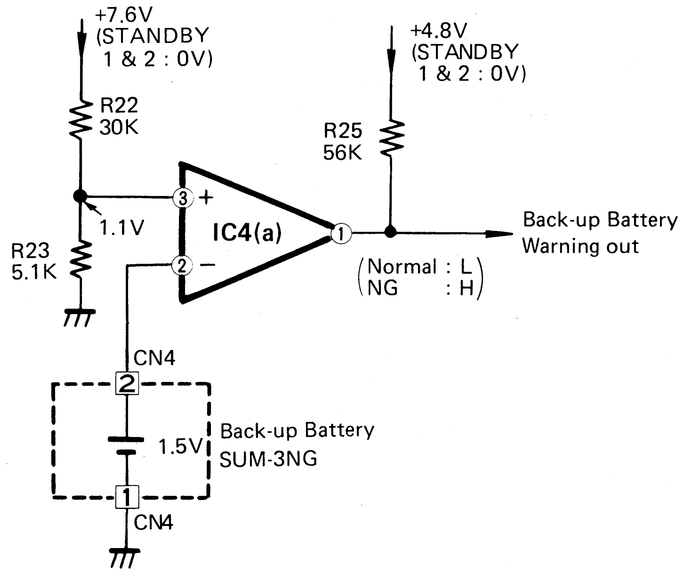

+7.6V
(STANDBY 1 & 2 : 0V)
R22
30K
+4.8V
(STANDBY 1 & 2 : 0V)
R25
56K
1.1V
R23
5.1K
IC4(a)
Back-up Battery Warning out
(Normal : L
NG : H)
CN4
1.5V
Back-up Battery SUM-3NG
CN4

Fig. 3-4-3 Back-up Battery Warning Circuit

3-5 Horizontal Deflection Circuit

Outline

This circuit generates the sawtooth current for the horizontal(H) beam deflection inside the pick-up tube, supplying it to the pick-up tube H. deflection coil.

Details

The horizontal scanning start(Hs) pulse supplied from the Process board goes via inverter Q15 to horizontal deflection output Q16. When Q16 is switched ON by the Hs pulse from Q15, the collector current pulse at Q16 resonates with L4 and C20, and the resultant horizontal sawtooth current is generated and supplied to the pick-up tube horizontal deflection coil through terminal No. 2 of CN3.
VR2 (H. SIZE) is a control for adjusting the horizontal scanning size.

3-6 Horizontal Linearity Correction Circuit

Outline

The horizontal (H) deflection circuit is of a switching type, so that the generated sawtooth current waveform has poor linearity. By feeding the sawtooth current to the deflection coil, the intensity of the magnetic field generated in the deflection coil is not linear as the pick-up tube's electron beam is deflected.
If a linear sawtooth current (A) is sent to the deflection coil, however, the magnetic field in the scanning start portion is distorted (B) due to the effect of the pick-up tube's electrodes, coil hysterisis, etc. As a result, the linearity of the scanning start portion deteriorates, and a shading (unevenness of amplitude) appears on the left edge of the picture.
Therefore, in order to generate a linear magnetic field intensity (D) and to correct the linearity and shading of the scanning start portion, it is necessary to feed a nonlinear sawtooth signal (C) to the deflection coil. This circuit generates a waveform to correct the linearity of horizontal sawtooth current waveform and its starting portion.
The horizontal deflection circuit is connected to one end of the horizontal deflection coil, and the horizontal linearity correction circuit to the other end.

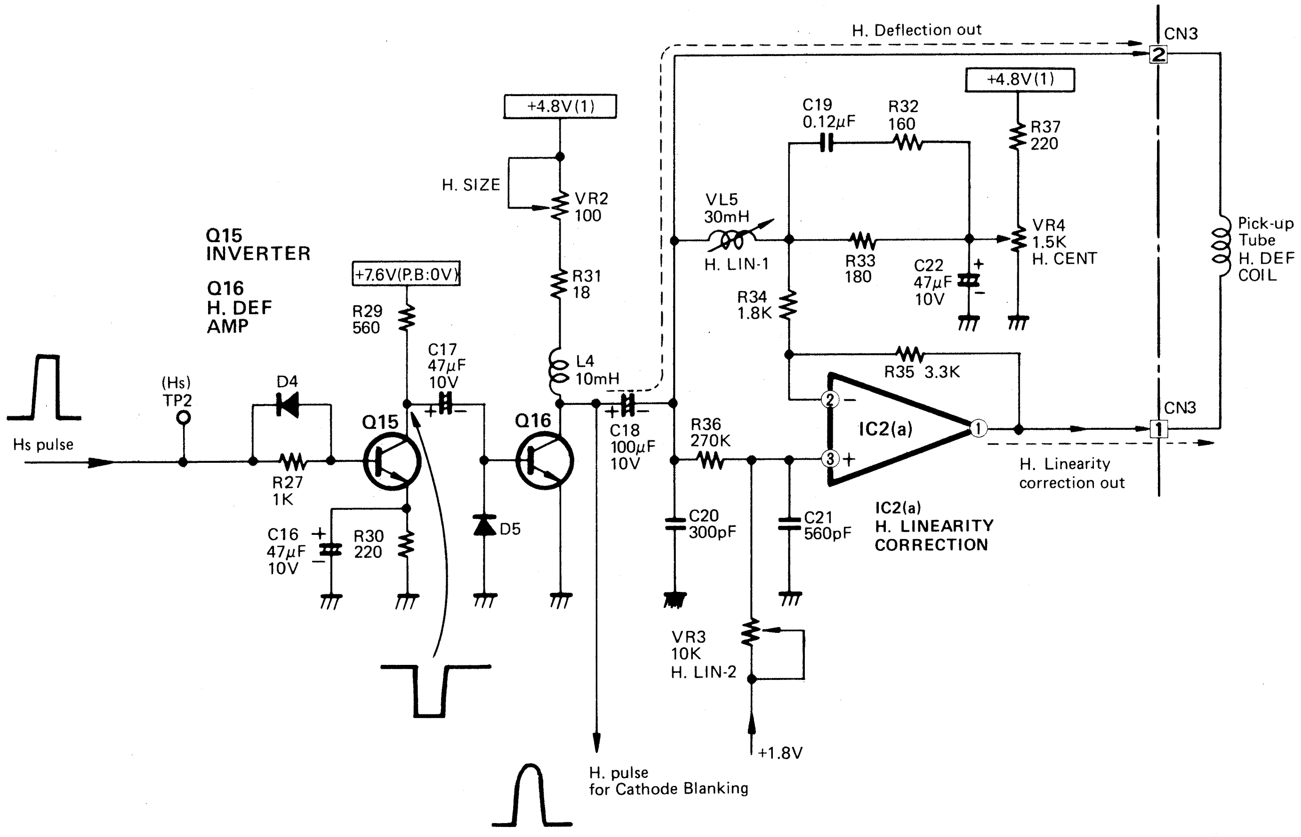

H. Deflection out
CN3
2
+4.8V(1)
+4.8V(1)
H. SIZE
VR2
100
Q15
INVERTER
Q16
H. DEF
AMP
+7.6V(P.B:0V)
R31
18
R29
560
C17
47μF
10V
L4
10mH
C18
100μF
10V
Hs pulse
(Hs)
TP2
D4
Q15
Q16
R27
1K
C16
47μF
10V
R30
220
D5
VL5
30mH
H. LIN-1
C19
0.12μF
R32
160
R37
220
VR4
1.5K
H. CENT
R33
180
C22
47μF
10V
R34
1.8K
R35 3.3K
R36
270K
IC2(a)
CN3
1
H. Linearity
correction out
Pick-up
Tube
H. DEF
COIL
C20
300pF
C21
560pF
IC2(a)
H. LINEARITY
CORRECTION
VR3
10K
H. LIN-2
+1.8V
H. pulse
for Cathode Blanking

Fig. 3-5 Horizontal Deflection Circuit

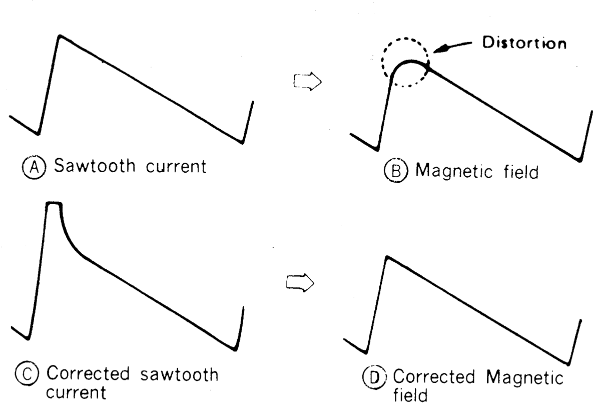

Distortion
Ⓐ Sawtooth current
Ⓑ Magnetic field
Ⓒ Corrected sawtooth current
Ⓓ Corrected Magnetic field

Fig. 3-6-1 Horizontal Linearity Correction-1

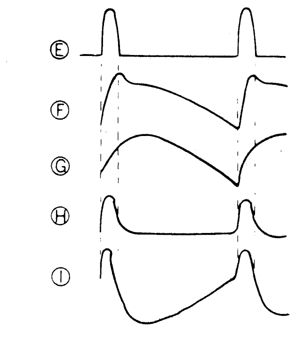


Fig. 3-6-2 Horizontal Linearity Correction-2

Details

The horizontal(H) pulse (E) produced from the collector of Q16 in the H. deflection circuit is integrated by VL5 and R33 into a sawtooth signal (F).
This sawtooth signal is again integrated by VL5, R32 and C19 into a parabola signal (G), which is applied through R34 to pin 2 of differential amplifier IC2 (a) as a H. linearity correction signal.
The H. pulse (E) from Q16 is integrated by R36 and C21 into a linearity correction signal (H) for correcting the linearity of the starting portion of the horizontal sawtooth current waveform. The starting portion linearity correction signal (H) is applied to pin 3 of IC2 where the linearity correction signal (G) and the starting portion linearity correction signal (H) are mixed and amplified. The mixed signal (I) of these linearity correction signals at pin 1 of IC2 is fed to the H. deflection coil to correct the linearity of the horizontal sawtooth current waveform.
VL5 (H. LIN-1) is a control for adjusting the overall linearity of sawtooth current.
VR3 (H. LIN-2) is a control for adjusting the linearity of the starting portion.
VR4 (H. CENTERING) is a centering control which controls the negative input potential of IC2 to change the direct current flowing to the H. deflection coil, and thus sets the horizontal scanning position on the pick-up tube.

3-7 Vertical Deflection Circuit

Outline

This circuit generates a sawtooth current for the vertical(V) beam deflection inside the pick-up tube, feeding it to the pick-up tube V. deflection coil.

Details

The vertical scanning start(Vs) pulse sent from the Process board is fed to sawtooth generator Q17 through buffer Q14 which converts it into a vertical rate sawtooth.
This sawtooth signal is applied to pin 2 of amplifier IC3, which produces an amplified vertical sawtooth signal from its output pin 1. This amplified signal is sent to the pick-up tube vertical deflection coil.
The sawtooth current flowing to the vertical deflection coil is detected by R45 which is connected in series with the deflection coil, and fed back to sawtooth generator Q17, thus correcting the linearity of the vertical sawtooth waveform. Therefore, a linear sawtooth current flows into the pick-up tube vertical deflection coil.
VR5 (V.SIZE) is the control for the amplitude of the vertical deflection sawtooth waveform to set vertical scanning size.
VR6 (V. CENTERING) is a centering control which controls the direct current flowing to the vertical deflection coil through buffer IC3(b) to set the vertical scanning position on the pick-up tube.

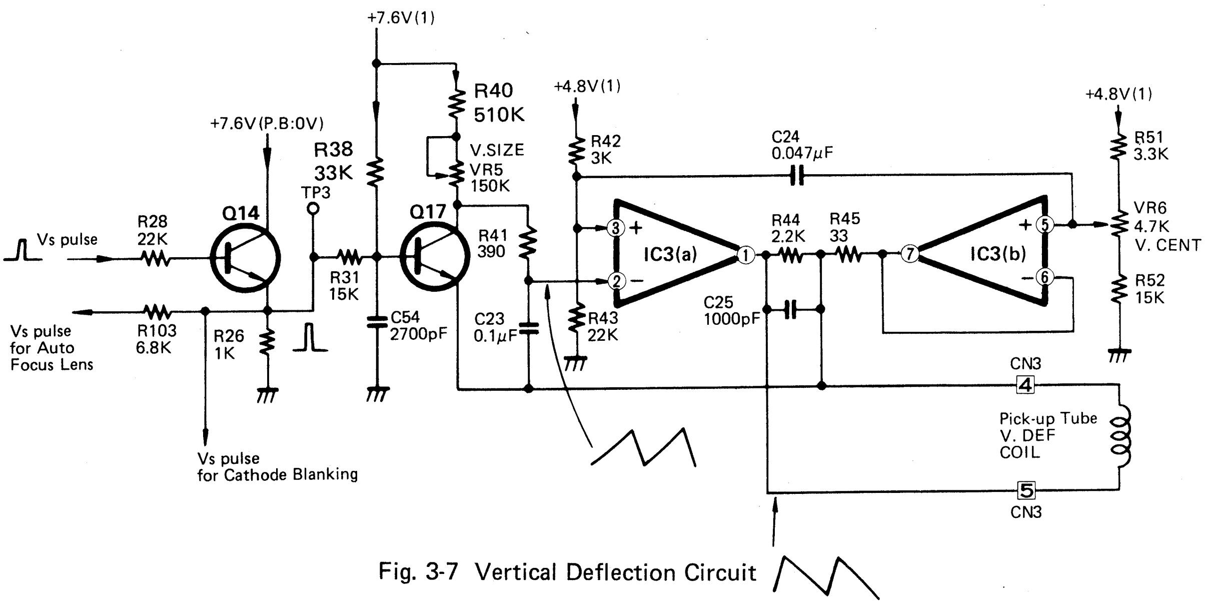

+7.6V(1)
R40
510K
+4.8V(1)
+4.8V(1)
+7.6V(P.B:0V)
R38
33K
TP3
R42
3K
C24
0.047μF
R51
3.3K
V.SIZE
VR5
150K
Q14
Q17
R28
22K
Vs pulse
R41
390
R31
15K
③+
②−
IC3(a)
①
R44
2.2K
R45
33
⑦
IC3(b)
+⑤
−⑥
VR6
4.7K
V. CENT
R52
15K
Vs pulse
for Auto
Focus Lens
R103
6.8K
R26
1K
C54
2700pF
C23
0.1μF
R43
22K
C25
1000pF
CN3
4
Pick-up Tube
V. DEF
COIL
5
CN3
Vs pulse
for Cathode Blanking

Fig. 3-7 Vertical Deflection Circuit

3-8 Target Voltage Setting Circuit

Outline

The target voltage setting circuit supplies the DC voltage to target of pick-up tube.

Details

+70V DC supplied from the high voltage circuit is divided by R62 and R63 to get the bias voltage of the base of Q22. The collector voltage of Q22 is controlled by VR10 (TARGET) and the approx. +50V DC is fed to target of pick-up tube through process board and preamplifier board.

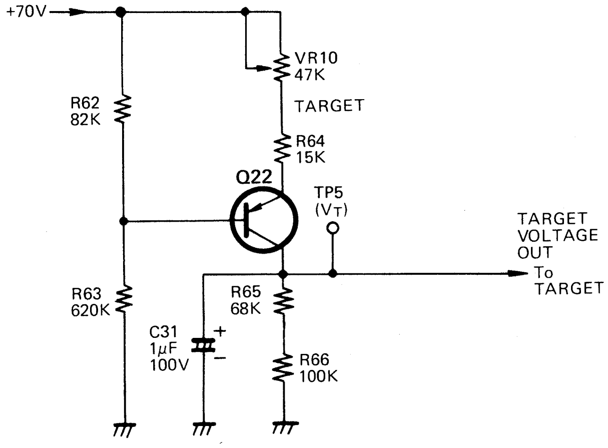

+70V
VR10
47K
TARGET
R62
82K
R64
15K
Q22
TP5
(VT)
TARGET
VOLTAGE
OUT
To
TARGET
R63
620K
R65
68K
C31
1μF
100V
R66
100K

Fig. 3-8 Target Voltage Control Circuit

3-9 Cathode Blanking/Beam Detect Circuit

Cathode Blanking Circuit

Outline

This circuit generates a cathode blanking pulse and supplies it to the pick-up tube cathode(K) in order to eliminate the retrace scanning lines.

Details

The horizontal(H) pulse at the collector of H.deflection output Q16 and the vertical scanning start (Vs) pulse from the Process board through inverter Q18 and Q19 are supplied to base of the switching amplifier Q20 respectively.
The mixed signal obtained at the emitter of Q20 is supplied to the cathode(K) of pick-up tube through terminal No. 4 of BI1 as a cathode blanking pulse.

Beam Detect Circuit

Outline

This circuit detect the current flow from the pick-up tube cathode (K) and generate the control signal. This control signal is then fed to the Audio/Lens Control board to control the automatic iris control (AIC) lens and automatic white balance control (AWC) circuit in Micro processor board.

Details

When the power switch is initially turned ON, it takes some times for cathode of the pick-up tube to be heated sufficiently in order to emit electrons at full force. Therefore, during initial period of the time after turn ON the power switch, no current flow from the cathode (K) of the pick-up tube to Q20 and no DC bias apply to the base of Q21 thus Q21 stays OFF and potential at the collector of Q21 stays high(H).

This high potential at the collector of Q21 is fed to the Audio/Lens Control board to set the automatic iris control (AIC) lens to close iris position in order to protect the pick-up tube from the burning. (Refer to Automatic Iris Control circuit in Audio/Lens Control board.)

Also this high potential supplied to the Micro processor board inhibits the automatic white balance control (AWC) circuit in the micro processor. (Refer to Auto White Balance Control circuit in Micro processor board.)

After the pick-up tube warm up, current flows from the cathode normally then DC bias obtained at the base of Q21 to turn Q21 ON and potential at the collector of Q21 becomes low (L).

This low potential is supplied to the Micro processor board to operate AWC circuit normally and the Audio/-Lens Control board to operate AIC lens.

3-10 Bias Light Circuit

Bias Light Circuit

Outline

The pick-up tube produces dark current when the light is blocked by capping the lens for example.

The dark current of SATICON^{TM} is extramely small comparing with vidicon. Therefore, when the camera is aimed at the dark scene, potential at the photoconductive (target) layer of SATICON^{TM} becomes lower than that of vidicon and the electron beam becomes insufficient to discharge the target. As a result, the beam does not respond to the variation of incoming light intensity to the SATICON^{TM} and lag increases. (When a moving object is shot, or when the camera is panned, a trailing image is exhibited. This trailing image is called lag.) In order to minimize the lag, bias light LEDs are positioned in front of pick-up tube for increasing the light intensity of the SATICON^{TM}.

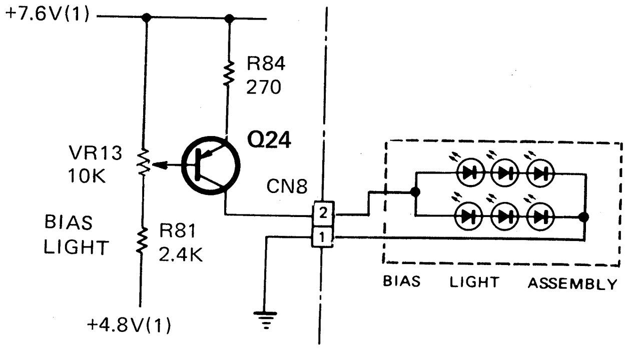

+7.6V(1)
R84
270
Q24
VR13
10K
CN8
2
1
BIAS
LIGHT
R81
2.4K
+4.8V(1)
BIAS LIGHT ASSEMBLY

Fig. 3-10 Bias Light Circuit

Details

The DC current adjusted by VR13(BIAS LIGHT) flows into bias light LEDs in the bias light assembly through Q24 and pin 2 of CN8 to light them in order to keep the light intensity of the pick-up tube to certain level. VR13 adjusts the brightness of LEDs.

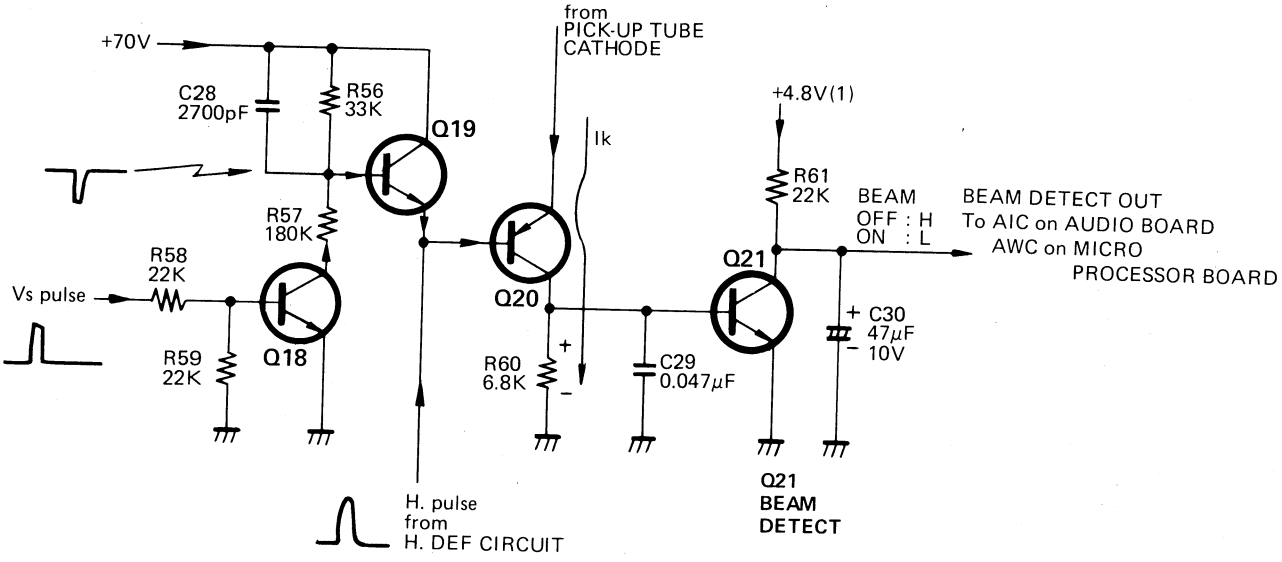

+70V
C28
2700pF
R56
33K
Q19
from
PICK-UP TUBE
CATHODE
Ik
+4.8V(1)
R61
22K
BEAM
OFF : H
ON : L
BEAM DETECT OUT
To AIC on AUDIO BOARD
AWC on MICRO
PROCESSOR BOARD
R57
180K
R58
22K
Vs pulse
Q18
R59
22K
Q20
Q21
R60
6.8K
C29
0.047µF
C30
47µF
10V
H. pulse
from
H. DEF CIRCUIT
Q21
BEAM
DETECT

Fig. 3-9 Cathode Blanking and Beam Detect Circuit

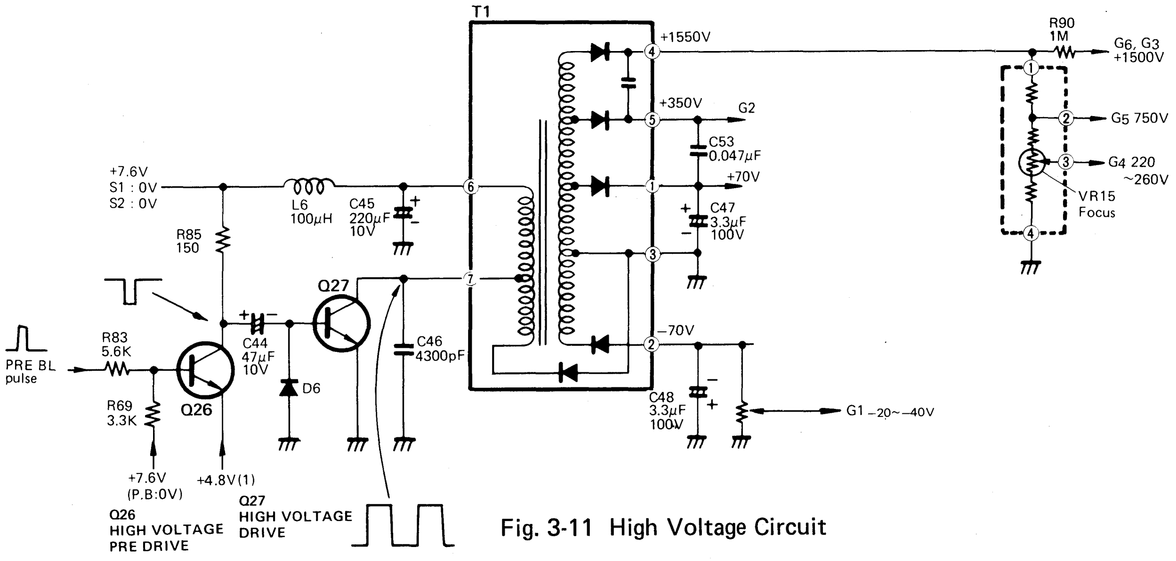

T1
+1550V
+350V
G2
C53
0.047μF
+70V
C47
3.3μF
100V
-70V
C48
3.3μF
100V
G1 -20~-40V
R90
1M
G6, G3
+1500V
G5 750V
G4 220
~260V
VR15
Focus
+7.6V
S1 : 0V
S2 : 0V
L6
100μH
C45
220μF
10V
R85
150
Q27
C44
47μF
10V
C46
4300pF
D6
R83
5.6K
PRE BL
pulse
R69
3.3K
Q26
+7.6V
(P.B:0V)
+4.8V(1)
Q26
HIGH VOLTAGE
PRE DRIVE
Q27
HIGH VOLTAGE
DRIVE

Fig. 3-11 High Voltage Circuit

3-11 High Voltage Circuit

Outline

This circuit generates high voltages needed for the pick-up tube.

Details

The pre-blanking(PRE BL) pulse generated in the Process board is supplied to the primary winding of step-up transformer in high voltage pack T1 through inverter Q26 and driver Q27 to step up the PRE-BL pulse to necessary level.

The boosted pulses obtained at the secondary winding of step-up transformer are rectified to generate high voltages.

The high voltages are derived as follows.

The -70V obtained at pin 2 of T1 is fed to grid-1(G1) through Q28. VR14(BEAM) is a control for the beam amount of pick-up tube.

The +350V at Pin 5 of T1 is applied to grid-2(G2) directly.

The +1.5kV obtained at pin 4 of T1 is supplied to grid-6(G6).

The voltages for grid-4(G4) and grid-5(G5) are obtained by dividing +1.5kV by block resistor Z1 and VR15-(FOCUS) in Z1.

The +70V obtained at pin 1 of T1 is fed to cathode blanking circuit and target voltage control circuit.

3-12 EVF Video Amplifier Circuit

Outline

This circuit amplifies the video signal supplied from the Process board and feeds it to the cathode ray tube(CRT) together with the level indicator signal which indicates the video level and character signal which generated in the Microprocessor board for graphics display on the CRT screen.

Details

The PAL signal from the Process board is applied to pin 18 of IC5 through trap CF6 which located on the Process board for removing the chrominance components in the PAL signal. The video signal is clamped and amplified at inside IC5 then mixed with level indicator signal and character signal.

The mixed signal obtained at pin 24 of IC5 is supplied to grid-1(G1) of the CRT through VR3(CONTRAST) and amplifier Q2 in the Viewfinder board.

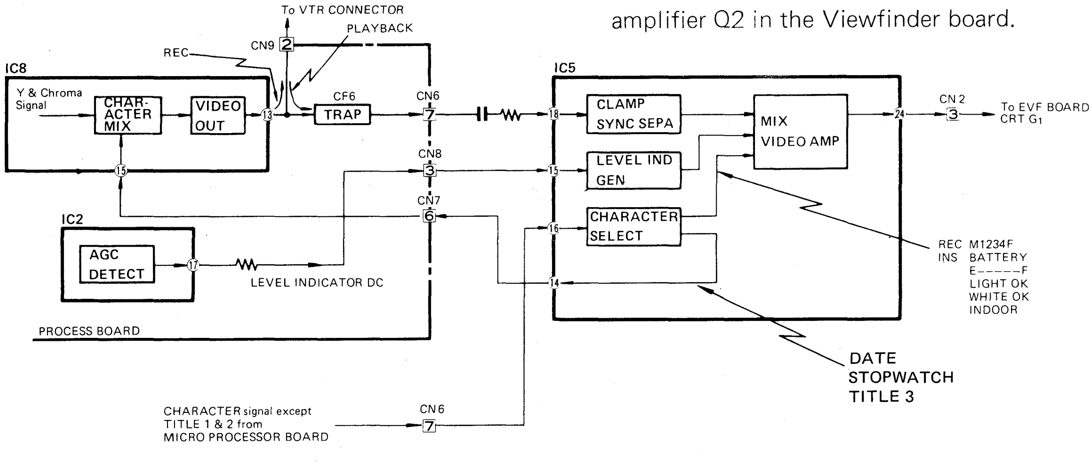

To VTR CONNECTOR
PLAYBACK
REC
CN9
IC8
Y & Chroma Signal
CHAR-ACTER MIX
VIDEO OUT
CF6
TRAP
CN6
IC5
CLAMP SYNC SEPA
MIX VIDEO AMP
LEVEL IND GEN
CHARACTER SELECT
CN8
CN7
IC2
AGC DETECT
LEVEL INDICATOR DC
PROCESS BOARD
CN 2
To EVF BOARD CRT G1
REC M1234F
INS BATTERY
E-----F
LIGHT OK
WHITE OK
INDOOR
DATE
STOPWATCH
TITLE 3
CHARACTER signal except TITLE 1 & 2 from MICRO PROCESSOR BOARD
CN6

Fig. 3-12 EVF Video Amplifier Circuit

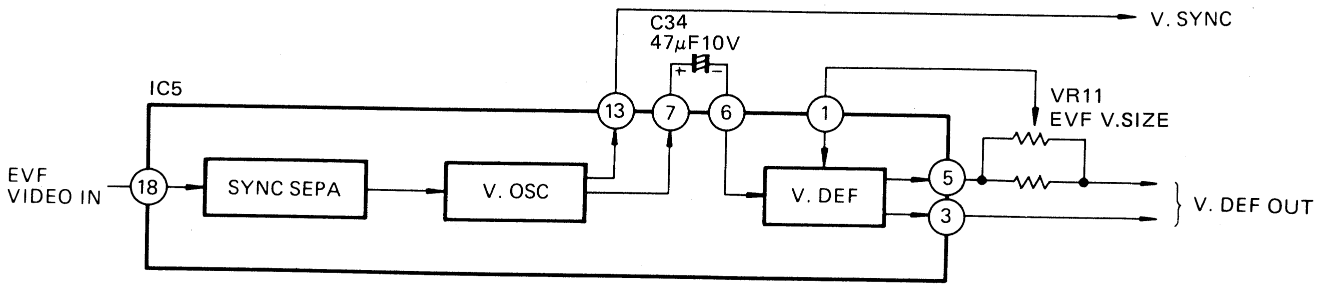


Fig. 3-13 EVF V. Deflection Circuit

3-13 EVF Vertical Deflection Circuit

Outline

This circuit generates vertical deflection sawtooth current for vertical scanning of beam inside the cathode ray tube(CRT).

Details

The video signal from the Process board is supplied to the sync separator in IC5 through pin 18 of IC5.
The sync separator in IC5 detects only sync pulse of video signal and V. sync pulse is made.
The vertical(V) sync pulse generated in the sync separation circuit is fed to V. oscillator (V.OSC) inside IC5 as a trigger pulse. The V. OSC is a free-renning sawtooth generator whose frequency is approximately 45Hz. When the trigger pulse is supplied to the V.OSC circuit, it generates a 50Hz sawtooth signal.
The V. sawtooth signal obtained at pin 7 is fed to amplifier through pin 6 of IC5, where it is amplified. The amplified V. sawtooth signal at pin 5 of IC5 is fed to the CRT V. deflection coil through terminal No. 5 of CN2.
VR11 (EVF V.SIZE) is a control for vertical scanning size.
The V. sync pulse obtained at pin 13 of IC5 is supplied to Microprocessor board.

3-14 EVF H. Oscillation Circuit

Outline

This circuit controls the frequency (phase) of the horizontal sawtooth current to correspond to that of horizontal(H) sync pulse separated from video signal.

Details

The horizontal(H) sync pulse from the sync separator is applied to phase comparator inside IC5. The H. oscillation signal from the H. oscillator (H. OSC) circuit inside IC5 also is fed to phase comparator and they are compared with the H. sync pulse in phase. The DC voltage corresponding to the phase difference is fed to H.OSC to control its oscillation frequency. In this way, the H. OSC is automatically controlled to match its oscillation frequency with that of sync pulse. VR12(H.HOLD) is a control for setting the oscillation frequency in a steady state.
The frequency controlled H. drive(H.D) pulse obtained at pin 22 of IC5 is then fed to the EVF board through terminal No. 4 of CN2 to generate H. deflection sawtooth current.
The H. sync pulse obtained at pin 23 is supplied to Microprocessor board.

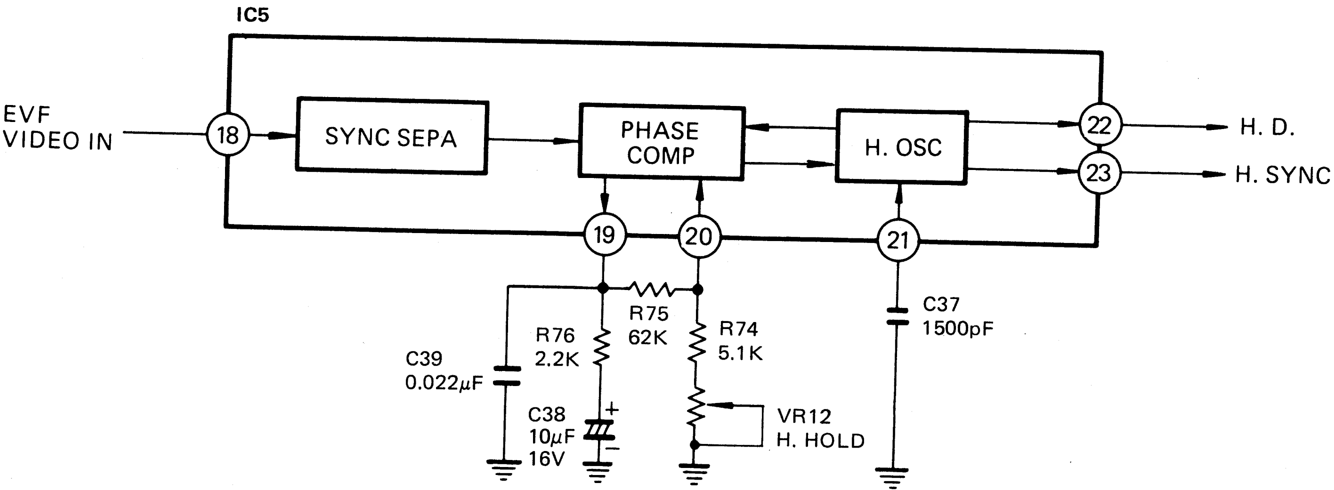


Fig. 3-14 EVF H. Oscillation Circuit

3-15 Standby Circuit

Outline

When recording outdoors, using camera and VTR, the power reserve of the battery must be conserved as much as possible, which is the exact function of the standby circuit.

Details

When the standby switch SW1 on the Standby board is set to ON position, practically all circuits in the camera and the VTR are operational, that is, the power sources are supplied to all electric circuits in the Deflection, Process, Micro processor, Lens and Viewfinder boards in the camera and +12V is consumed in the VTR.
When the standby switch SW1 on the right side of the camera is set to STANDBY 1 position, +8.6V power source goes only to the heater of pick-up tube and cathode ray tube (CRT). At the same time a standby signal (approx. +3V) generated in Audio/Lens board is supplied to the portable VTR through pin 5 of VTR cable to set the VTR to standby position.
+5V DC power is also applied to micro processor to maintain the all micro processor functions.
When the standby switch is set to STANDBY-2 position, +5V DC power is only supplied to micro processor. All circuit except micro processor are shut off in STANDBY-2 condition.

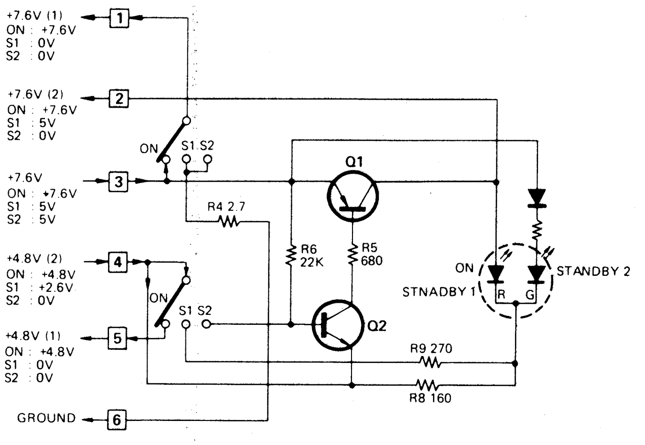

+7.6V (1)
ON : +7.6V
S1 : 0V
S2 : 0V
+7.6V (2)
ON : +7.6V
S1 : 5V
S2 : 0V
+7.6V
ON : +7.6V
S1 : 5V
S2 : 5V
+4.8V (2)
ON : +4.8V
S1 : +2.6V
S2 : 0V
+4.8V (1)
ON : +4.8V
S1 : 0V
S2 : 0V
GROUND
1
2
3
4
5
6
ON
S1 S2
ON
S1 S2
Q1
Q2
R4 2.7
R6 22K
R5 680
R9 270
R8 160
ON
STNADBY 1
STANDBY 2
R
G

Fig. 3-15 Standby Circuit

3-16 Playback Control Circuit

Outline

This circuit sense the recording or playback of the portable VTR.
When the portable VTR is set into the playback mode, this circuit shuts off horizontal(H) and vertical(V) deflection and high voltage circuits and the playback signal from the VTR is supplied to the viewfinder. When the portable VTR is set into the recording mode, this circuit sets the all circuits in the camera to operating condition and PAL output signal is supplied to the viewfinder and the portable VTR for recording.

Details

When the portable VTR is set into the recording mode, no DC bias is applied to the emitter of Q25 and Q25 remains ON, and Q4 & Q29 are also ON so that +7.6V at the collector of Q29 is supplied to the H and V deflection, Audio/Lens Control board and high voltage circuit to function these circuits normally.
When the portable VTR is set into the playback mode, the playback signal which rides on top of +6V DC is supplied from the VTR to the playback detect circuit on Process board. +4.8V DC generated at playback board for cutting off high voltages generation and closing lens iris. In this way, the PAL signal is not generated in the camera and the playback signal from the portable VTR is supplied to the viewfinder.

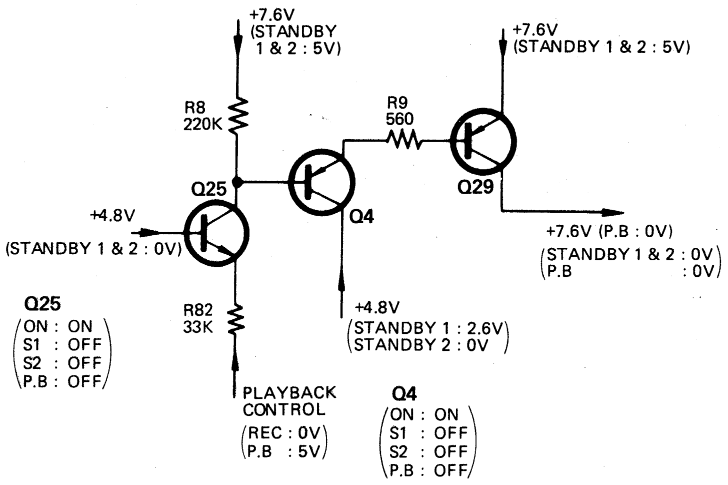

+7.6V
(STANDBY 1 & 2 : 5V)
+7.6V
(STANDBY 1 & 2 : 5V)
R8 220K
R9 560
Q25
Q4
Q29
+4.8V
(STANDBY 1 & 2 : 0V)
+7.6V (P.B : 0V)
(STANDBY 1 & 2 : 0V
P.B : 0V)
R82 33K
+4.8V
(STANDBY 1 : 2.6V
STANDBY 2 : 0V)
Q25
(ON : ON
S1 : OFF
S2 : OFF
P.B : OFF)
PLAYBACK CONTROL
(REC : 0V
P.B : 5V)
Q4
(ON : ON
S1 : OFF
S2 : OFF
P.B : OFF)

Fig. 3-16 Playback Control Circuit

4 Process Board (YFVPKA2003EA)

The Process Board contains following circuits.

4-1 Pulse Generator Circuit 20
4-2 Signal Processing Circuit 22
  4-2-1 Bias light Shading Correction Circuit . . . 22
  4-2-2 Optical Black Clamp Circuit 23
  4-2-3 Gamma Correction Circuit 24
  4-2-4 Automatic Iris Control Detection Circuit 24
  4-2-5 Automatic Gain Control Circuit 25
  4-2-6 Y_H Signal Circuit 25
  4-2-7 Y_L Signal Circuit 26
4-3 Horizontal Aperture Signal Generator Circuit 26
4-4 Vertical Edge Signal Generator Circuit . . 27
4-5 Red and Blue Separation & Chroma Processing Circuit 28
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  4-5-8 Chroma Clip Signal Circuit 36
4-6 Chrominance Encoding Circuit 37
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  4-6-3 Chroma Clip/Suppress Circuit 38
  4-6-4 White Set Detection Circuit 38
4-7 Burst Generator Circuit 39
4-8 Video Signal Processing Circuit 39
4-9 Playback Detect Circuit 43
4-10 White Balance Setting Circuit 43
4-11 VTR Remote Control/Fade Control Circuit 45
  4-11-1 VTR Remote Control Circuit 45
  4-11-2 Fade Control Circuit 46

4-1 Pulse Generator Circuit

Outline

This circuit generates all sync pulses used in the camera.

Details

The crystal oscillator which consists of crystal oscillator X1, CT5 (4.43MHz ADJ) and C113 connected between pin 2 and pin 3 of sync generator IC11 oscillates 17.7 MHz.

The voltage controlled oscillator (VCO) composed of VL15, C117, C119, D11 and D12 is connected to pin 9 and pin 10 of IC11 and phase-compared with the frequency oscillated by the crystal oscillator.

The phase detected output from pin 8 of IC11 is sent to variable capacitance diodes D11 and D12 through R246 to drive them and control the VCO frequency. This phase lock loop (PLL) circuit always keeps interleaving relationship among subcarrier, horizontal and vertical frequency generated by IC11.

The following pulses are generated form IC11.

Pin 4 :	(B-Y)SC	(Subcarrier for B-Y modulation)
Pin 6 :	(R-Y)SC	(Subcarrier for R-Y modulation)
Pin 15 :	W.BL	(Wide blanking pulse)
Pin 16 :	BFP	(Burst flag pulse)
Pin 17 :	SYNC	(Composite sync pulse)
Pin 18 :	BL	(Composite blanking pulse)
Pin 19 :	Vs	(Vertical scanning start pulse)
Pin 20 :	PRE BL	(Preblanking pulse)
Pin 21 :	CP1	(Clamp pulse-1)
Pin 22 :	Hs	(Horizontal scanning start pulse)

The timing information for each pulse is shown in Fig. 4-1-1.

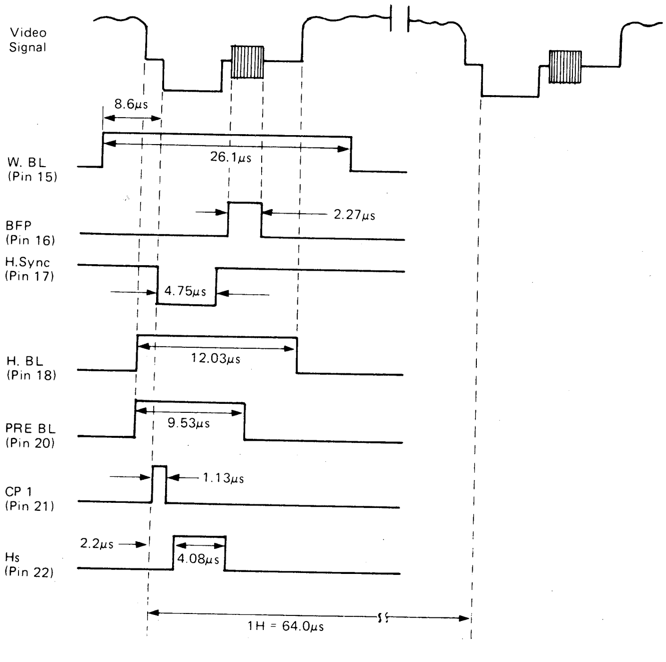


Fig. 4-1-1 Pulses

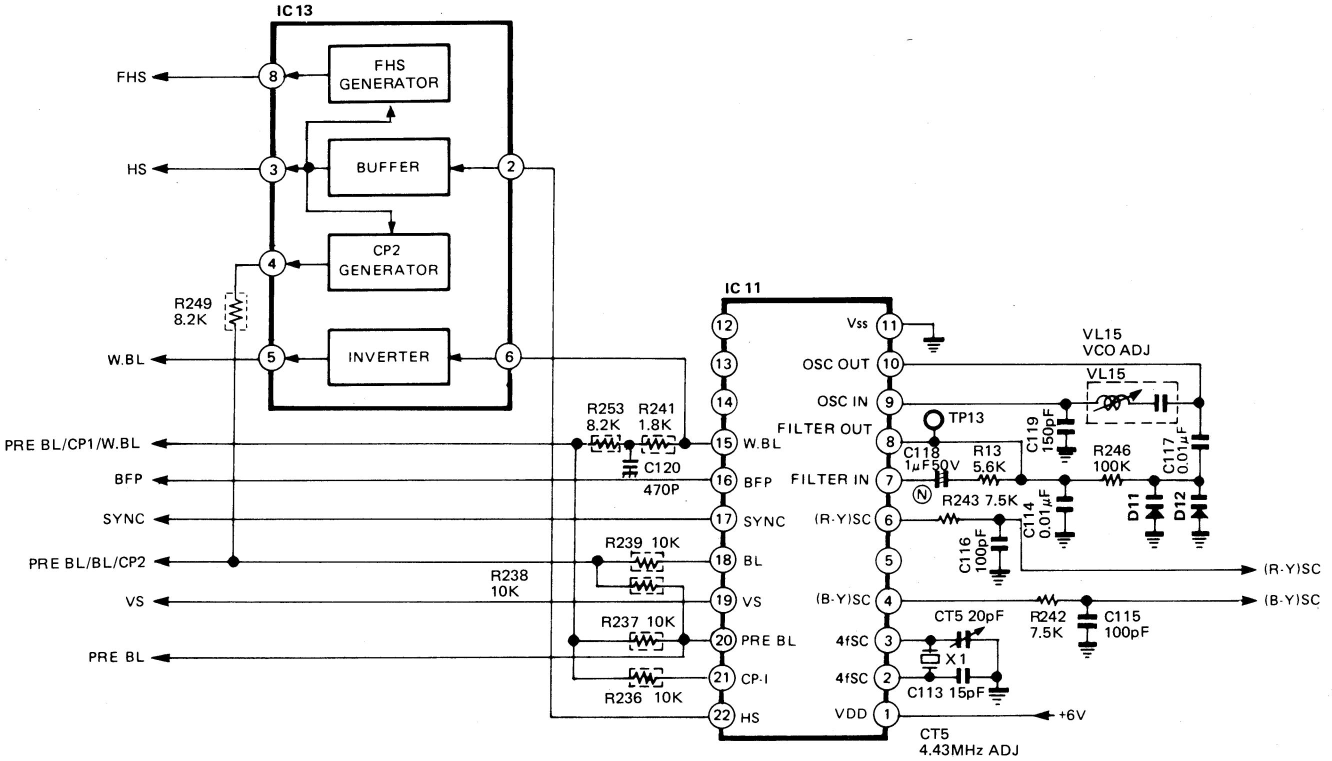

IC13
FHS
HS
W.BL
PRE BL/CP1/W.BL
BFP
SYNC
PRE BL/BL/CP2
VS
PRE BL
FHS GENERATOR
BUFFER
CP2 GENERATOR
INVERTER
R249 8.2K
IC 11
R253 8.2K
R241 1.8K
C120 470P
R239 10K
R238 10K
R237 10K
R236 10K
W.BL
BFP
SYNC
BL
VS
PRE BL
CP-I
HS
Vss
OSC OUT
OSC IN
FILTER OUT
FILTER IN
(R-Y)SC
(B-Y)SC
4fSC
4fSC
VDD
TP13
C118 1μF50V
R13 5.6K
C119 150pF
R246 100K
C117 0.01μF
R243 7.5K
C114 0.01μF
C116 100pF
D11
D12
VL15 VCO ADJ
VL15
CT5 20pF
X1
C113 15pF
R242 7.5K
C115 100pF
+6V
CT5 4.43MHz ADJ
(R-Y)SC
(B-Y)SC

Fig. 4-1-2 Pulse Generator Circuit

CT5 (4.43MHz ADJ) is a control for setting the subcarrier frequency. The (B-Y)SC and (R-Y)SC are supplied to other circuit respectively, through integrators consisting of R242 and C115, R243 and C116. The preblanking (PRE BL) pulse is fed to other circuit. The PRE BL pulse A is mixed with the clamp pulse-1 (CP1) B and wide BL pulse (W.BL) C through R237, R236 and R241. The PRE BL pulse A is also mixed with the blanking (BL) pulse E and the clamp pulse-2 (CP2) F comes from pin 4 of IC13. The multipled signals D and G thus made are supplied to other circuit.

The Hs pulse H is fed to the Deflection board through pin 3 of IC13.

The Hs pulse H at pin 2 of IC13 is differentiated inside IC13 and clamp pulse-2 (CP2) F is made. The CP2 is mixed with the PRE BL pulse A and the BL pulse E as previously explained.

The vertical scanning start (Vs) pulse is supplied to the Deflection board. It is also fed to other circuit.

The wide BL (W.BL) pulse is fed to other circuit through IC13.

The burst flag pulse (BFP) is fed to other circuit.

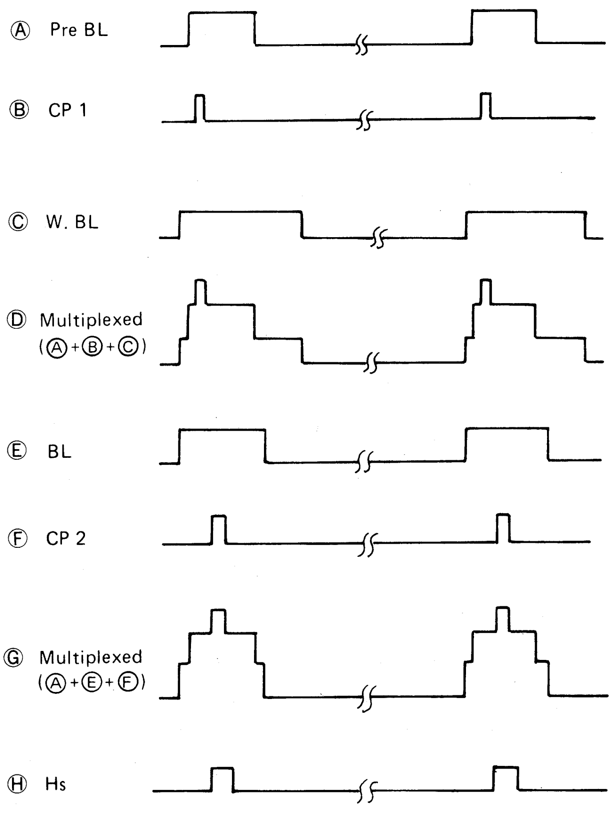

Ⓐ Pre BL
Ⓑ CP 1
Ⓒ W. BL
Ⓓ Multiplexed (Ⓐ+Ⓑ+Ⓒ)
Ⓔ BL
Ⓕ CP 2
Ⓖ Multiplexed (Ⓐ+Ⓔ+Ⓕ)
Ⓗ Hs

Fig. 4-1-3 Mixed Signals

4-2 Signal Processing Circuit

This circuit contains the bias light shading correction circuit, optical black clamp circuit, gamma correction circuit, automatic iris control detection circuit and automatic gain control circuit.

4-2-1 Bias Light Shading Correction Circuit

Outline

The bias light LEDs are located in front of the pick-up tube for minimizing the lag by increasing the light intensity reaches the pick-up tube as described in Deflection board. But the light intensity from the bias light LEDs are bot uniform in actual scanning area.
The bias light shading correction circuit equalizes the output of the pick-up tube uniformly.
The horizontal bias light shading correction signal supplied from pin 20 of IC6 (FAMOS IC) corrects the horizontal bias light shading. Also the vertical bias light shading correction signal made by VR8 and VR9 on deflection board and the bias light correction section inside IC2 on process board corrects the vertical bias light shading.

Details

The output signal of the Preamplifier board is mixed with the horizontal bias light shading correction signal supplied through R26 from pin 20 of IC6, it goes to the amplifier inside IC2 through pin 5. The amplified pre-video signal from the amplifier is mixed with the modulated preblanking (PRE BL) pulse for vertical bias light shading.

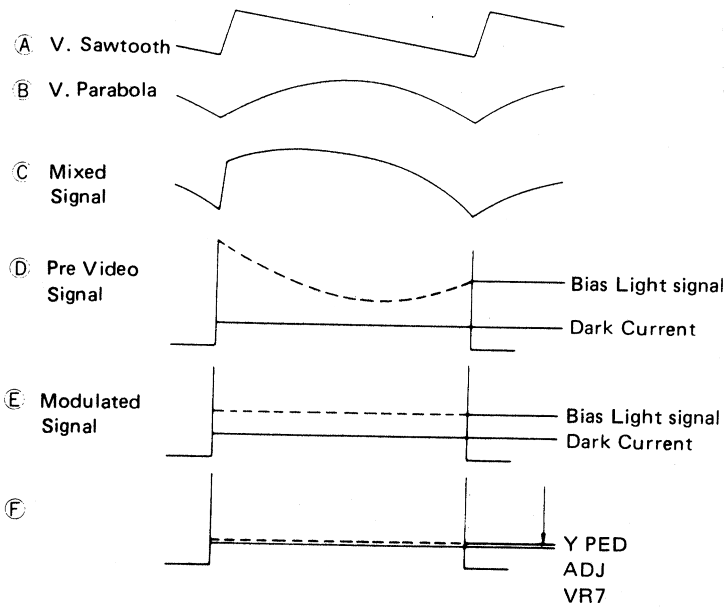

Ⓐ V. Sawtooth
Ⓑ V. Parabola
Ⓒ Mixed Signal
Ⓓ Pre Video Signal
Bias Light signal
Dark Current
Ⓔ Modulated Signal
Bias Light signal
Dark Current
Ⓕ
Y PED ADJ VR7

Fig. 4-2-1 Bias Light Correction

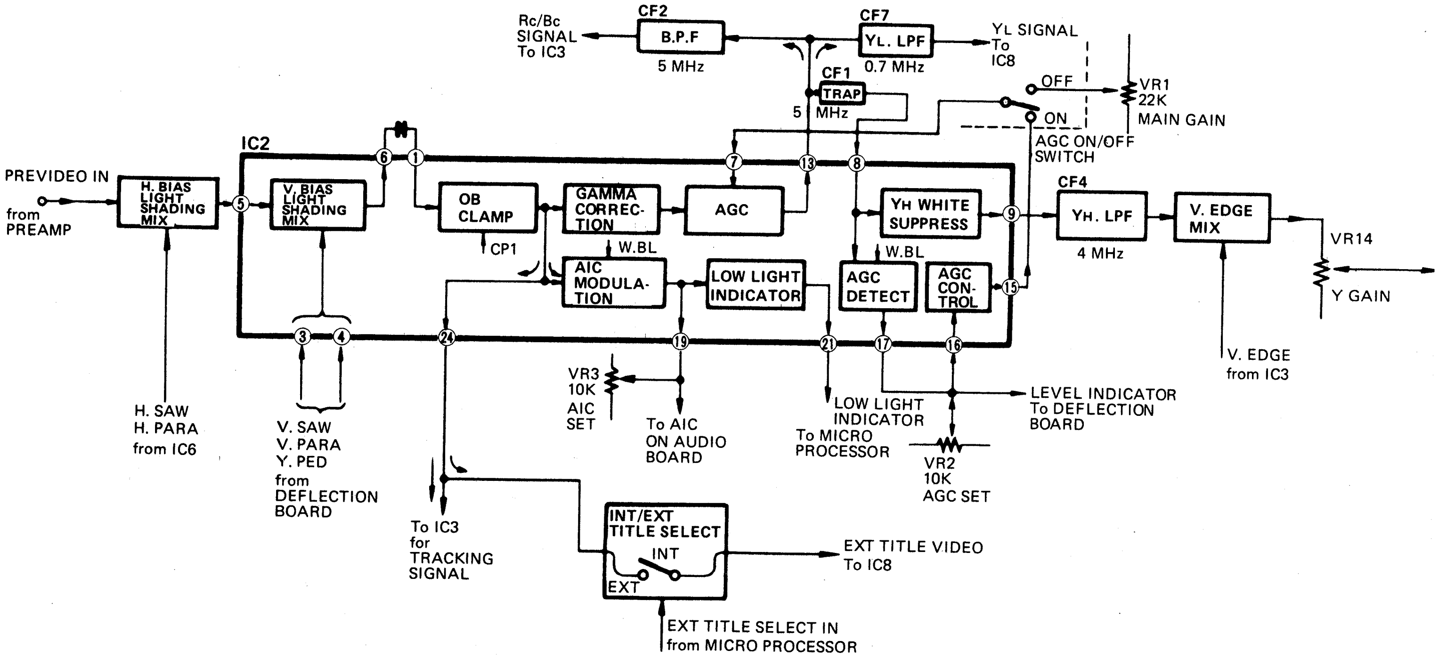

Rc/Bc SIGNAL To IC3
CF2
B.P.F
5 MHz
CF7
YL. LPF
0.7 MHz
YL SIGNAL To IC8
CF1
TRAP
5 MHz
OFF
ON
VR1 22K MAIN GAIN
AGC ON/OFF SWITCH
IC2
PREVIDEO IN from PREAMP
H. BIAS LIGHT SHADING MIX
V. BIAS LIGHT SHADING MIX
OB CLAMP
CP1
GAMMA CORREC-TION
W.BL
AIC MODULA-TION
AGC
LOW LIGHT INDICATOR
YH WHITE SUPPRESS
W.BL
AGC DETECT
AGC CON-TROL
CF4
YH. LPF
4 MHz
V. EDGE MIX
VR14
Y GAIN
V. EDGE from IC3
⑤ ⑥ ① ⑦ ⑬ ⑧ ⑨ ⑮ ③ ④ ㉔ ⑲ ㉑ ⑰ ⑯
H. SAW H. PARA from IC6
V. SAW V. PARA Y. PED from DEFLECTION BOARD
VR3 10K AIC SET
To AIC ON AUDIO BOARD
LOW LIGHT INDICATOR To MICRO PROCESSOR
LEVEL INDICATOR To DEFLECTION BOARD
VR2 10K AGC SET
To IC3 for TRACKING SIGNAL
INT/EXT TITLE SELECT
INT
EXT
EXT TITLE VIDEO To IC8
EXT TITLE SELECT IN from MICRO PROCESSOR

Fig. 4-2-2 Signal Processing Circuit

The vertical(V) sawtooth A and parabola B signals are fed to the wiper arms of VR9 (Bs V.SAW) and VR8 (Bs V.PARA) respectively in the Deflection board.
These waveforms are applied from the Deflection board to both the non-inverted (pin 3) and inverted (pin 4) inputs of bias light shading correction circuit in IC2, where a positive or negative mixed signal C of V.sawtooth and parabola signals are made depending on the position of these controls.
VR7 (Y PED) controls the positive input potential of bias light shading correction circuit to change the DC level of mixed signal C.
The multiplexed signal of the clamp pulse-1 (CP1), PRE BL pulse and W.BL pulse is fed from the pulse generator circuit to the pulse separator inside IC2 through pin 22, where the CP1, PRE BL pulse and W.BL pulse are separated.
The separated PRE BL pulse is fed to the bias light shading correction circuit inside IC2. The amplified pre-video signal D is then modulated by the signal C and PRE BL pulse (E & F).
The corrected pre-video signal is then fed to the clamp circuit in IC2.

4-2-2 Optical Black Clamp Circuit

Outline

The pick-up tube sends an output current corresponding to the incoming light intensity, but even when no light reaches the target, an output current called dark current is obtained.
The dark current of the pick-up tube varies with the temperature of the pick-up tube. In a TV camera using a pick-up tube, the dark level of the output signal is unstable with respect to changing temperature.
In a color camera using the single carrier frequency multiplexing system, the red(R) and blue(B) signals modulated at 5MHz are riding on top of the green(G) signal. Thus the black level of the R and B signals are free from temperature variations because they are independent of pick-up tube dark current. However, the black level of the Y signal which is obtained by removing the modulated R and B components from the pick-up tube output increases or decreases according to temperature variations. Therefore, the black level balance between the Y_L and R signals, and between Y_L and B signals are lost due to a temperature variations and this causes a change in color reproduction. This circuit receives the pre-video signal from the bias light shading correction circuit and clamps its dark current level for correcting the black level variation.

Details

The pre-video signal which contains the modulated red/blue signals and green signal is fed from the optical black correction circuit to the optical black clamp circuit inside IC2. A metallic strip (optical black) for cutting the incoming light at the end of the horizontal scanning period is built into the pick-up tube faceplate. When the beam scans the optical black portion G , the dark current of the pick-up tube is produced and this signal portion H is clamped to a fixed DC potential, so that the black level variation due to a change of dark current is sensed.
In other words, the dark current level H of the pre-video signal H supplied to the clamp circuit inside IC2 is clamped by the clamp pulse-1 (CP1) I separated from the multiplexed signal of CP1, pre BL and wide BL pulses inside IC2. (The multiplexed signal of CP1, pre BL and wide BL pulses are generated in the pulse generator circuit, mixed and then fed to the pulse separator where they are separated.)
Therefore, even if the dark current level drifts due to the temperature variations, the DC potential of the optical black (OB) level is held constant.
In this way, the black level variation is corrected.

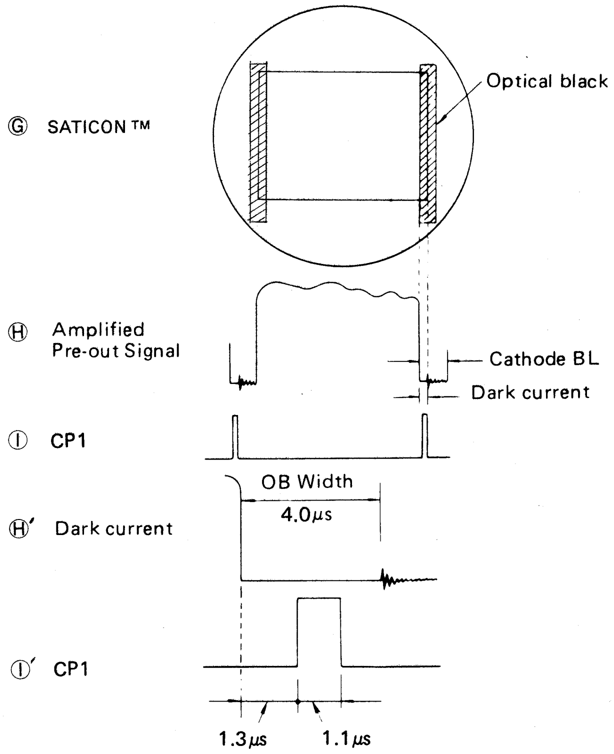


Fig. 4-2-3 OB Clamp

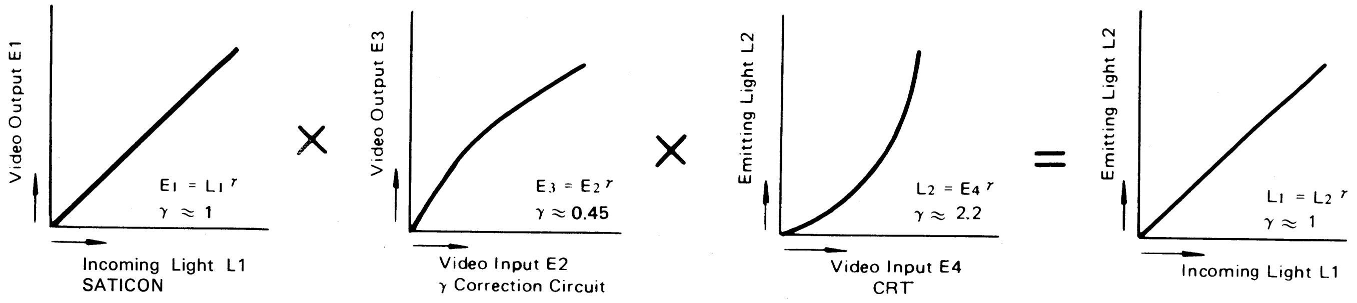


Fig. 4-2-4 Gamma Correction

4-2-3 Gamma Correction Circuit

Outline

This circuit corrects the non-linear photoelectric conversion characteristic of cathode ray tube (CRT) and reproduces a linear picture of high fidelity on the monitor.

In order for a televised picture to have the same contrast gradation as the original scene, the system (including the pick-up tube, signal processing inside camera and monitor, and CRT) gamma must be equal to 1.

The gamma characteristic of SATICON™ is approx. 1.0 and the gamma characteristic of the monitor CRT is approx. 2.2, so that the gamma characteristic of the gamma correction circuit should be approx. 0.45, which makes the total gamma to be approx. 1.0 as shown in Fig. 4-2-4.

Details

The pre-video signal is fed to the gamma(r) correction circuit and undergoes the gamma correction.

Since the modulated red(R) and blue(B) signals are ridden on the green(G) signal, the negative feedback gamma correction circuit is adapted.

4-2-4 Automatic Iris Control Detection Circuit

Outline

This circuit detects the DC voltage corresponding to the light intensity and sends this DC voltage to the automatic iris control drive circuit in the Audio/Lens Control board.

Details

The wide BL (W.BL) pulse separated from CP1/PRE BL/W.BL mixed signal is supplied to the AIC modulation circuit inside IC2 from the pulse separator.

The pre-video signal is fed from the PRE BL mix circuit to the modulation circuit, where the pre-video signal is modulated by the W.BL pulse.

The modulated pre-video signal is peak-rectified in the modulation circuit and converted into DC voltage corresponding to the pre-video level i.e., the incoming light intensity. This DC voltage is fed through pin 19 of IC2 and terminal N0. 13 of CN3 to the automatic iris control circuit in the Audio/lens control board together with the DC voltage set by VR3 (AIC SET) which sets the normal iris stop at the standard light intensity. The DC voltage is also supplied to the low light indicator circuit in IC2.

When the camera is operated in the normally illuminated scene, the output from the low light indicator at pin 21 of IC2 is low level. However, when the camera is aimed at the weakly illuminated scene, the output becomes high level and it is sent to the Micro processor board for displaying the graphics in the EVF.

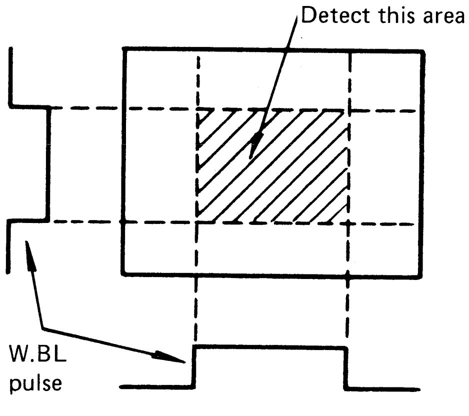


Fig. 4-2-5 Automatic Iris Control Detection and Automatic Gain Control Detection

4-2-5 Automatic Gain Control Circuit

Outline

This circuit amplifies the preamplifier output signal. The amplified signal level is maintained constant by automatically gain controlled amplifier. The gain of the amplifier starts to vary only when the lens iris is fully opened.

Details

The pre-video signal from the gamma correction circuit in IC2 is fed through the AGC amplifier and amplifier to trap CF1 which removes the 5MHz modulated component and the luminance (Y) signal is obtained. The Y signal is then applied to the AGC detect circuit where the Y signal is modulated by the wide BL pulse from the pulse separator and the modulated Y signal is made for detecting signal level corresponding to the center image. The modulated Y signal is peakrectified in the AGC detect circuit and converted into DC voltage corresponding to the Y signal level i.e., the incoming light intensity. This DC voltage is then fed through pins 17 and 16 of IC2 to the AGC control circuit where it is compared with the reference DC voltage. The error between the DC voltages is fed through the AGC ON/OFF switch SW4 to the AGC amplifier to control its gain.

When the camera is used in the normally illuminated scene, the signal level is maintained constant by automatically iris adjusted lens. Therefore the gain of AGC amplifier does not change. However, when the camera is aimed at the weakly illuminated scene and lens iris becomes wide open, the Y signal level is decreased. The decreased Y signal level is detected by the AGC detection circuit and converted into the DC voltage. This DC voltage is fed through the AGC control circuit and the AGC ON/OFF switch SW4 to the AGC amplifier to control the gain of amplifier.

In this way the signal level corresponding to normal and relatively high illumination is kept constant by the lens iris opening, while the signal level corresponding to relatively low illumination is controlled by the AGC circuit.

The gain controlled pre-video signal which has the modulated red and blue signal at pin 13 of IC2 is supplied to the luminance signal processing circuit and red and blue separation circuit.

VR2 (AGC SET) sets the gain of the amplifier at the standard light intensity in the automatic gain control mode.

VR1 (MANUAL GAIN) sets the gain of the amplifier at the standard light intensity in the manual gain control mode.

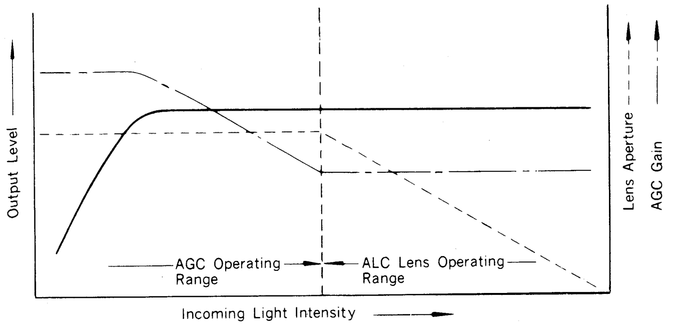


Fig. 4-2-6 AGC Operation

4-2-6 Y_H Signal Circuit

Outline

This circuit receives the amplified pre-video signal from the automatic gain control circuit and generates the luminance (Y_H) signal having high frequency response characteristic.

Details

The amplified pre-video signal is fed from the AGC circuit through pin 13 of IC2 to trap CF1 which removes the 5MHz modulated component and luminance (Y) signal is obtained. The Y signal at pin 8 of IC2 is fed to the Y_H white suppress circuit, where the high level of Y signal is slightly suppressed. The suppressed Y signal is then supplied to 4MHz low pass filter CF4, where the frequency response of Y signal is limited to 4MHz, and the Y_H signal having high frequency response characteristic is generated.

The Y_H signal is then mixed with the vertical edge signal supplied from the vertical edge signal generator circuit. After its level is set by VR14 (Y GAIN), the Y_H signal is supplied to the horizontal aperture signal circuit in IC8.

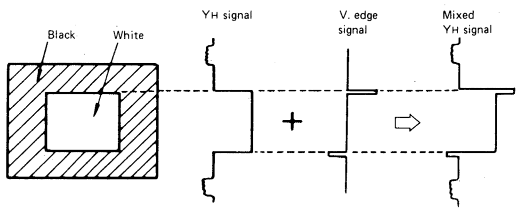


Fig. 4-2-7 Y_H Signal Processing

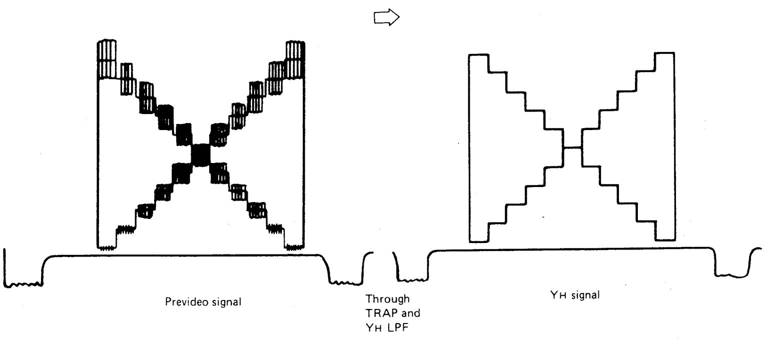


Fig. 4-2-8 Trap Effect

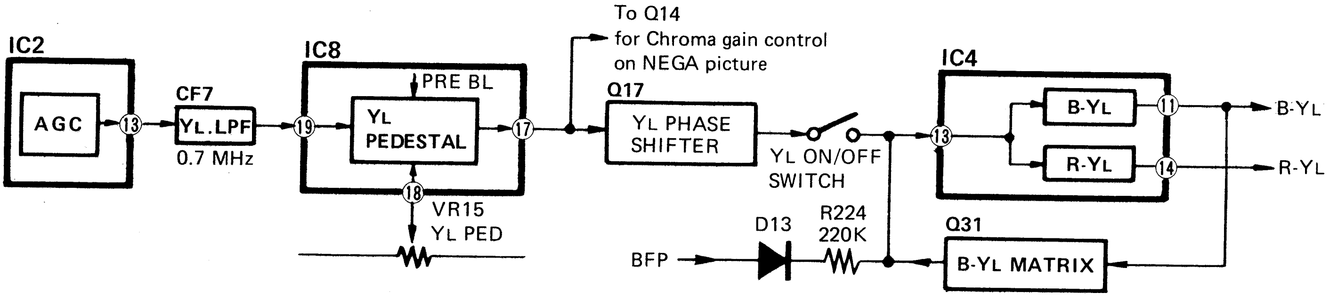

IC2
AGC
13
CF7
YL.LPF
0.7 MHz
IC8
19
PRE BL
YL PEDESTAL
17
18
VR15
YL PED
To Q14 for Chroma gain control on NEGA picture
Q17
YL PHASE SHIFTER
YL ON/OFF SWITCH
BFP
D13
R224 220K
IC4
13
B-YL
R-YL
11
14
B-YL
R-YL
Q31
B-YL MATRIX

Fig. 4-2-9 Y_L Signal Circuit

4-2-7 Y_L Signal Circuit

This circuit receives the amplified pre-video signal from the automatic gain control circuit and generates the luminance (Y_L) signal having low frequency response characteristic.

Details

The amplified pre-video signal is fed from the AGC circuit through pin 13 of IC2 to 0.7MHz low pass filter CF7, where the 5MHz modulated component is removed and the luminance (Y_L) signal of which frequency response is limited to 0.7MHz is obtained. The Y_L signal thus made is fed to the Y_L pedestal circuit inside IC8, where Y_L signal is mixed with the pre BL pulse and the mixed signal is made. The mixed signal's low level pre BL portion is clipped and its pedestal level is set. The clip level (pedestal level) is set by VR15 (Y_L PED).

The Y_L signal whose pedestal level is set is supplied from pin 17 of IC8 to pin 13 of IC4, the R-Y_L/B-Y_L signal circuit in the red and blue separation & Chroma processing circuit through Y_L phase shifter Q17.
CT3 (Y_L PHASE) is a control for Y_L phase.
Q31 is a matrix circuit which amplifies and inverts the R-Y_L signal and mix it to Y_L signal for better color reproduction.

4-3 Horizontal Aperture Signal Generator Circuit

Outline

This circuit generates the horizontal(H) edge (aperture) signal to enhance the horizontal resolution.

Details

The luminance (Y_H) signal having high frequency response is fed from the Y_H signal circuit to the H.aperture generator circuit.

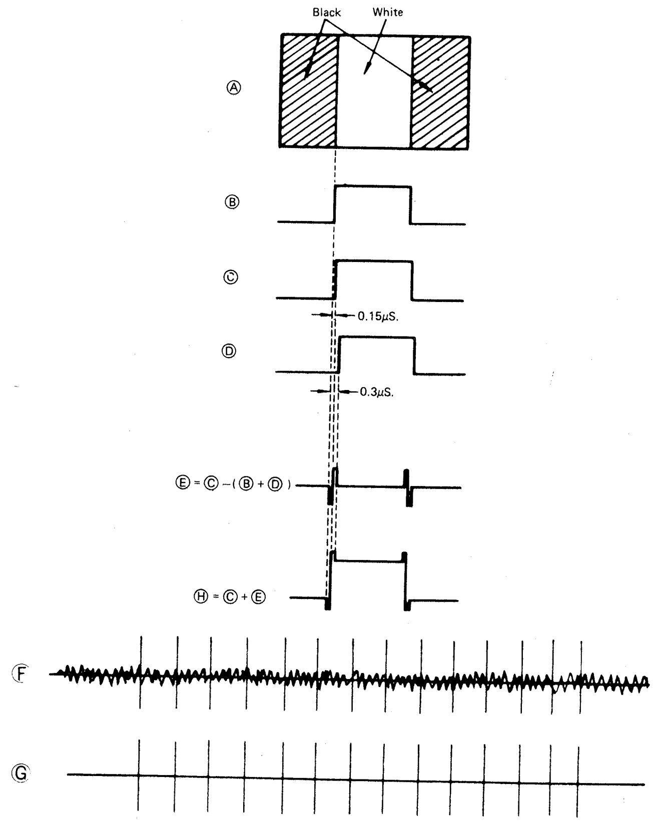


Fig. 4-3-1 Horizontal Aperture Signal

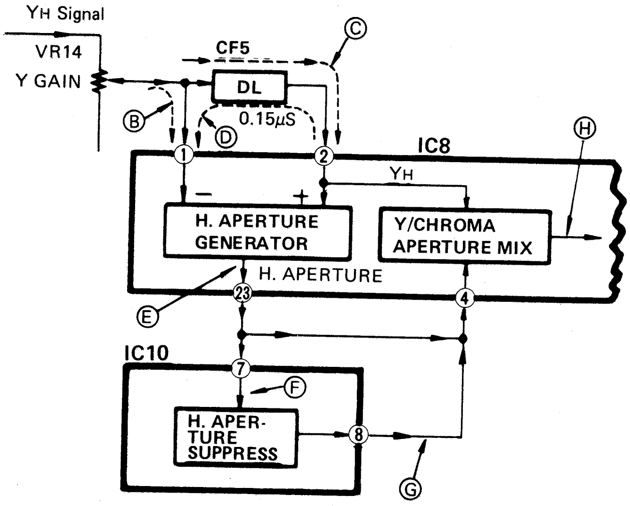

YH Signal
VR14
Y GAIN
CF5
DL
0.15μS
Ⓑ
Ⓒ
Ⓓ
1
2
IC8
Ⓗ
YH
−
+
H. APERTURE GENERATOR
Y/CHROMA APERTURE MIX
H. APERTURE
23
4
Ⓔ
IC10
7
Ⓕ
H. APERTURE SUPPRESS
8
Ⓖ

Fig. 4-3-2 Horizontal Aperture Signal Generator Circuit

When the camera is aimed at an object A for example, the signal B passed through pin 1 of IC8, signal C delayed 0.15 μs by delay line CF5 and amplified in the H.aperture generator circuit and signal D which results from the delayed Y_H signal being reflected back through CF5 and delayed again (0.3 μs) appear at the output of the H.aperture generator circuit where they are mixed in fixed proportions to make up the H.aperture signal E. The H.aperture signal obtained in this way is applied through pin 23 of IC8 and pin 7 of IC10 to the H.aperture noise suppress/coring circuit, where the noise mixed in the H.aperture signal F is removed (G).

The H.aperture signal which undergoes the noise coring is then supplied through pin 4 of IC8 to the Y/chroma/aperture mix circuit, where it is mixed with the luminance and chrominance signal.

4-4 Vertical Edge Signal Generator Circuit

Outline

This circuit generates a vertical edge signal for increasing the vertical resolution by enhancing vertical edge contrast.

Details

The luminance (Y(edge)) signal A, for making the vertical(V) edge signal, supplied from pin 10 of IC2 is fed to the Y(edge) delay circuit IC9 (CCD:charged coupled device) through pin 5. In the Y(edge) delay circuit, the Y(edge) signal is delayed 1H line by IC9. The 1H delayed signal obtained at pin 2 of IC9 B is fed to pin 2 of IC3 through buffer Q18 and low pass filter CF8 and VR18 (V.EDGE BALANCE). Also the undelayed Y(edge) signal is fed from pin 10 of IC2 to pin 4 of IC3. The 1H delayed Y(edge) signal B is mixed with the undelayed Y(edge) signal A to form a vertical edge signal C. The vertical edge signal is fed to the V.edge amplifier in IC3. The amplified V.edge signal is fed to the detection circuit in IC3, where the positive V.edge signal D is generated. This signal is sent to the chroma gain control circuit to reduce the vertical spurious signal. The V.edge signal D is fed to the mixing circuit in IC3, where it is mixed with the amplified V.edge and V.edge signal E is made. The V.edge signal E is sent to the vertical transient spurious correction circuit inside IC3 through pin 9, and to the Y_H signal circuit where it is mixed with the Y_H signal to make sharp picture.

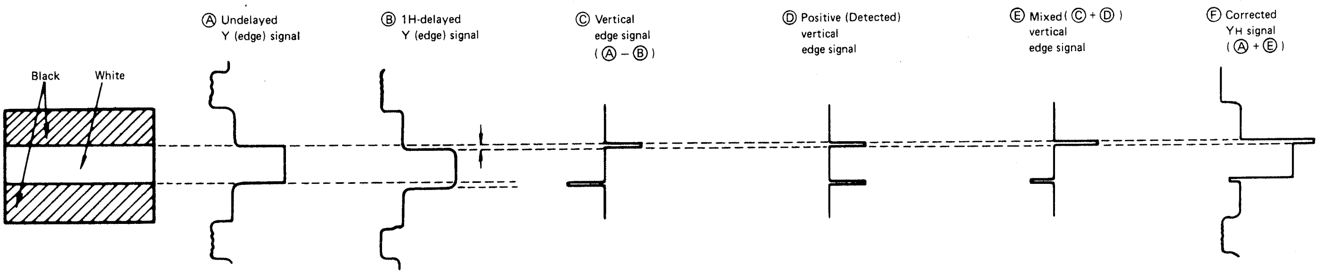

Ⓐ Undelayed Y (edge) signal
Ⓑ 1H-delayed Y (edge) signal
Ⓒ Vertical edge signal (Ⓐ – Ⓑ)
Ⓓ Positive (Detected) vertical edge signal
Ⓔ Mixed (Ⓒ + Ⓓ) vertical edge signal
Ⓕ Corrected YH signal (Ⓐ + Ⓔ)
Black
White

Fig. 4-4-1 Vertical Edge Signal

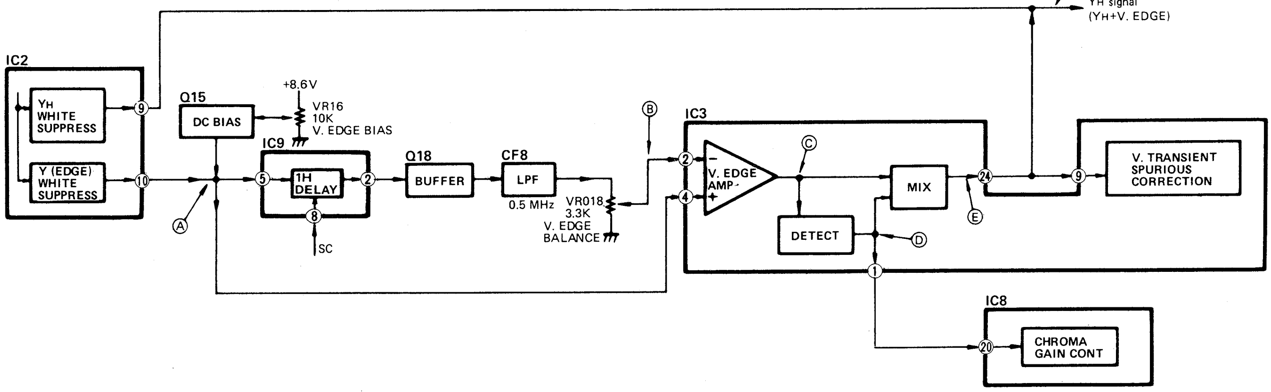

IC2
YH WHITE SUPPRESS
Y (EDGE) WHITE SUPPRESS
9
10
Ⓐ
Q15
DC BIAS
+8.6V
VR16 10K V. EDGE BIAS
IC9
5
1H DELAY
2
8
SC
Q18
BUFFER
CF8
LPF
0.5 MHz
VR018 3.3K V. EDGE BALANCE
Ⓑ
IC3
2
4
V. EDGE AMP
Ⓒ
MIX
DETECT
Ⓓ
1
24
Ⓔ
9
V. TRANSIENT SPURIOUS CORRECTION
Ⓕ
YH signal (YH+V. EDGE)
IC8
20
CHROMA GAIN CONT

Fig. 4-4-2 Vertical Edge Signal Generator Circuit

4-5 Red and Blue Separation & Chroma Processing Circuit

This circuit consists of the red and blue separation circuit, the vertical transient spurious correction circuit, the shading correction, the tracking correction circuit, the R-Y_L signal circuit, the B-Y_L signal circuit and the chroma clip signal circuit.

4-5-1 Red and Blue Separation Circuit

Outline

This circuit takes out the modulated red(Rc) and blue (Bc) signals from the combined preamplifier output signal which is composed of a green(G) signal mixed with 5MHz modulated red(Rc) and blue(Bc) signal.

Details

The amplified pre-video signal A obtained at pin 13 of IC2 is fed to 5MHz band pass filter (BPF) CF2 where the Rc/Bc signal B is detedted. The detected Rc/Bc signal is then supplied through VR4 (R/B GAIN) to the R/B gain control circuit.

When the lens iris becomes fully open, the modulation depth of red and blue signals decrease. It is compensated by controlling the gain of the R/B gain control circuit with the DC voltage corresponding to the lens iris opening. This DC voltage is fed from the lens to the R/B gain control circuit. The gain controlled Rc/Bc signal is then supplied to the 90° phase shifter through pre BL mix circuit where the noise on the blanking period is removed. The 90° phaseshifted Rc/Bc signal C obtained at pin 11 of IC3 is applied to the R/B separation circuit inside IC4 through pin 2. CT2 (R/B SEPARATION-1) is a control for shifting the phase of Rc/Bc signal by 90°.

The Rc/Bc signal B at pin 6 of IC3 is supplied to 1H delay line DL1 where it is delayed one horizontal line (64 μsec). 1H delayed Rc/Bc signal is then sent to the vertical transient spurious correction circuit inside IC3 through VR5 (R/B SEPARATION-2) and pin 18. (The vertical transient spurious correction circuit will be described later.)

The Rc/Bc signal D undergoes the vertical transient spurious correction and inverted in the correction circuit is applied to the R/B separation circuit inside IC4 through pin 24.

In the R/B separation circuit, the 90° phase-shifted Rc/Bc signal C and the inverted 1H-delayed Rc/Bc signal D are added forming the Rc signal E , and the Rc/Bc signal C and the Rc/Bc signal D are subtracted each other forming the Bc signal F .

The Rc and Bc signals thus separated are fed to the respective shading/tracking correction circuits.

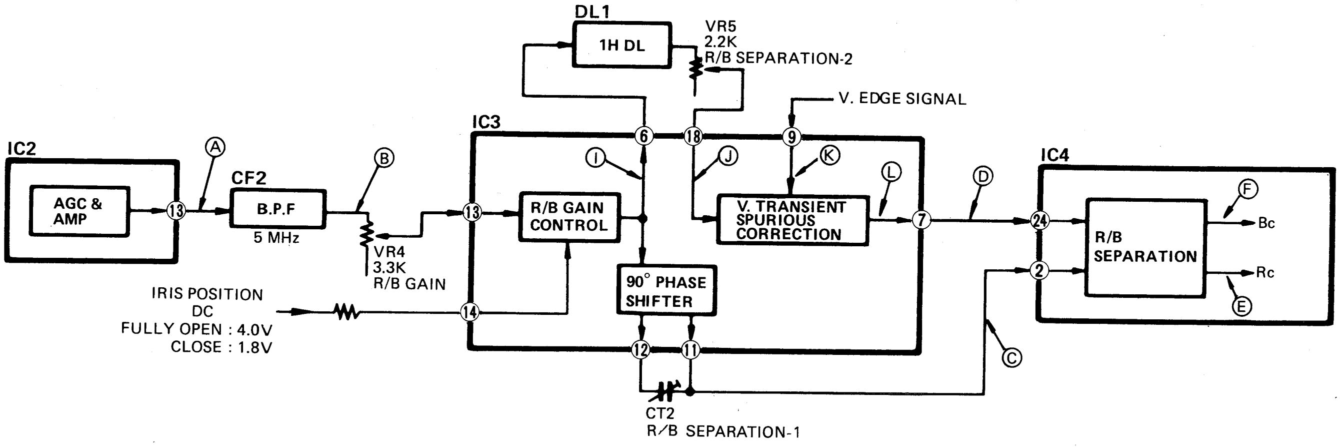


Fig. 4-5-1 Red and Blue Separation Circuit

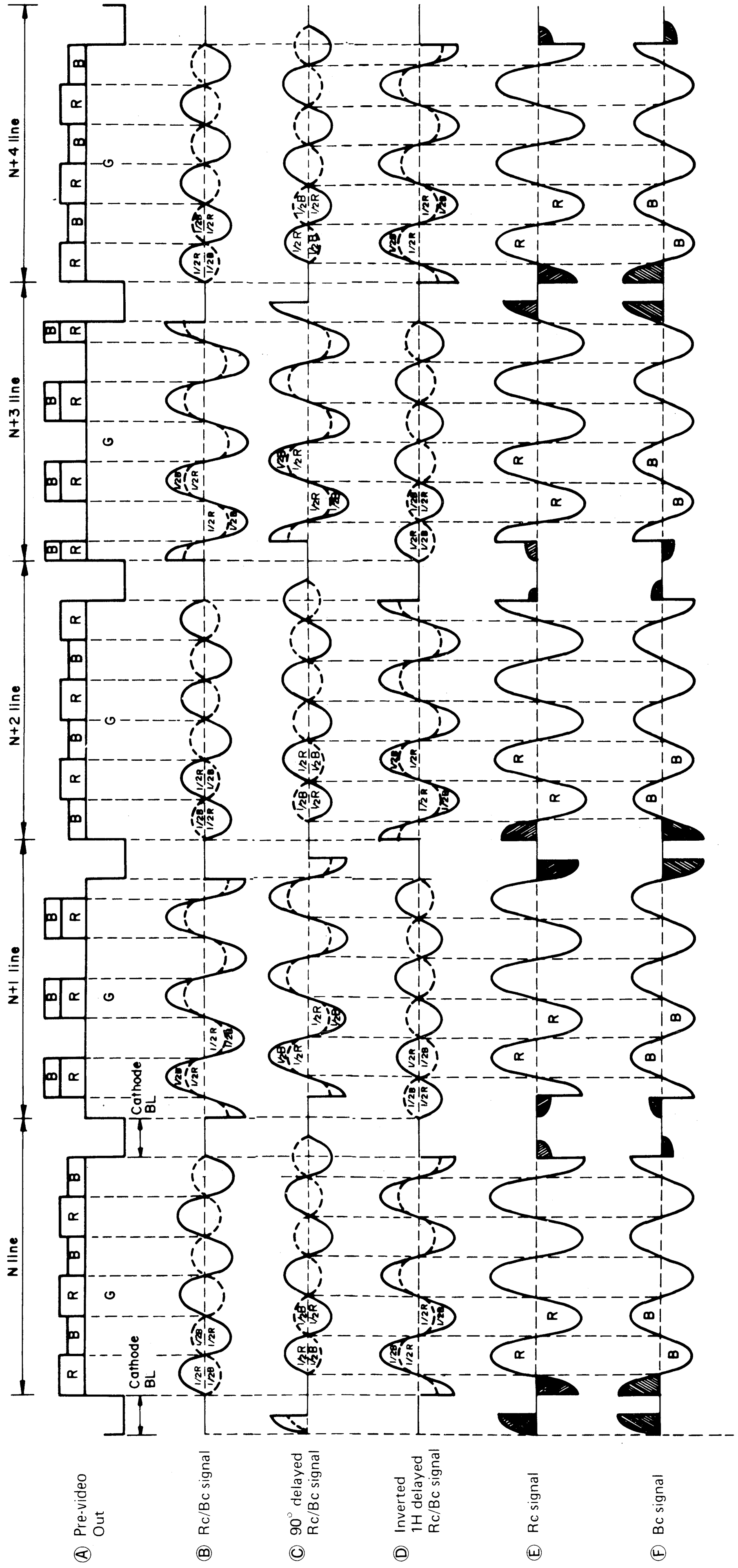

Ⓐ Pre-video Out
Ⓑ Rc/Bc signal
Ⓒ 90° delayed Rc/Bc signal
Ⓓ Inverted 1H delayed Rc/Bc signal
Ⓔ Rc signal
Ⓕ Bc signal
N line
N+1 line
N+2 line
N+3 line
N+4 line
Cathode BL
G
R
B
1/2R
1/2B

Fig. 4-5-2 Red and Blue Signal Separation

4-5-2 Vertical Transient Spurious Correction Circuit

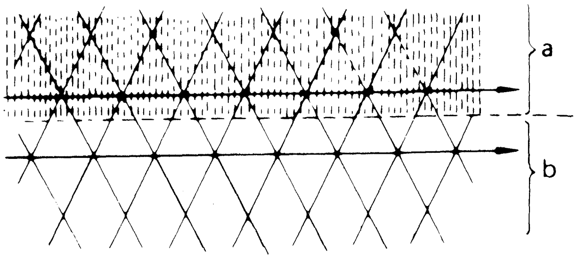
Outline

As described previously in red and blue separation circuit, the Rc and Bc signals are separated from each other by addition or subtraction of the Rc/Bc signal delayed one line(1H) and the 90° phase-shifted Rc/Bc signals but not delayed.

When a pattern such as shown below is seen by the camera, the Rc/Bc signal which is not delayed appears as in I , and the Rc/Bc signal delayed one line(1H) becomes as in J .

Therefore, it is impossible to secure vertical correlation between Rc/Bc signals of N+1 line, and a spurious signal differing in level of Rc and Bc signals against Y signal H is generated, and the vertical(V) edge of the object is unnaturally colored by this spurious signal.

The vertical transient spurious correction circuit controls the amplitude of 1H-delayed Rc/Bc signal J corresponding to the N+1 line with vertical(V) edge signal K and the signal L is made. This provides vertical correlation between Rc/Bc signals I and L prior to color separation.



a : Dark object
b : Bright object

Fig. 4-5-3

Details

The vertical edge signal K is sent from the vertical edge signal generator circuit to the vertical transient spurious correction circuit inside IC3 through pin 9 of IC3. In this circuit, those parts of the 1H-delayed Rc/Bc signal J which do not correlate with the Rc/Bc signal I (not 1H-delayed) are controlled in level by the vertical edge signal K. The corrected Rc/Bc signal L is fed to the R/B separation circuit inside IC4 through pin 2 of IC4 and pin 24 of IC4.

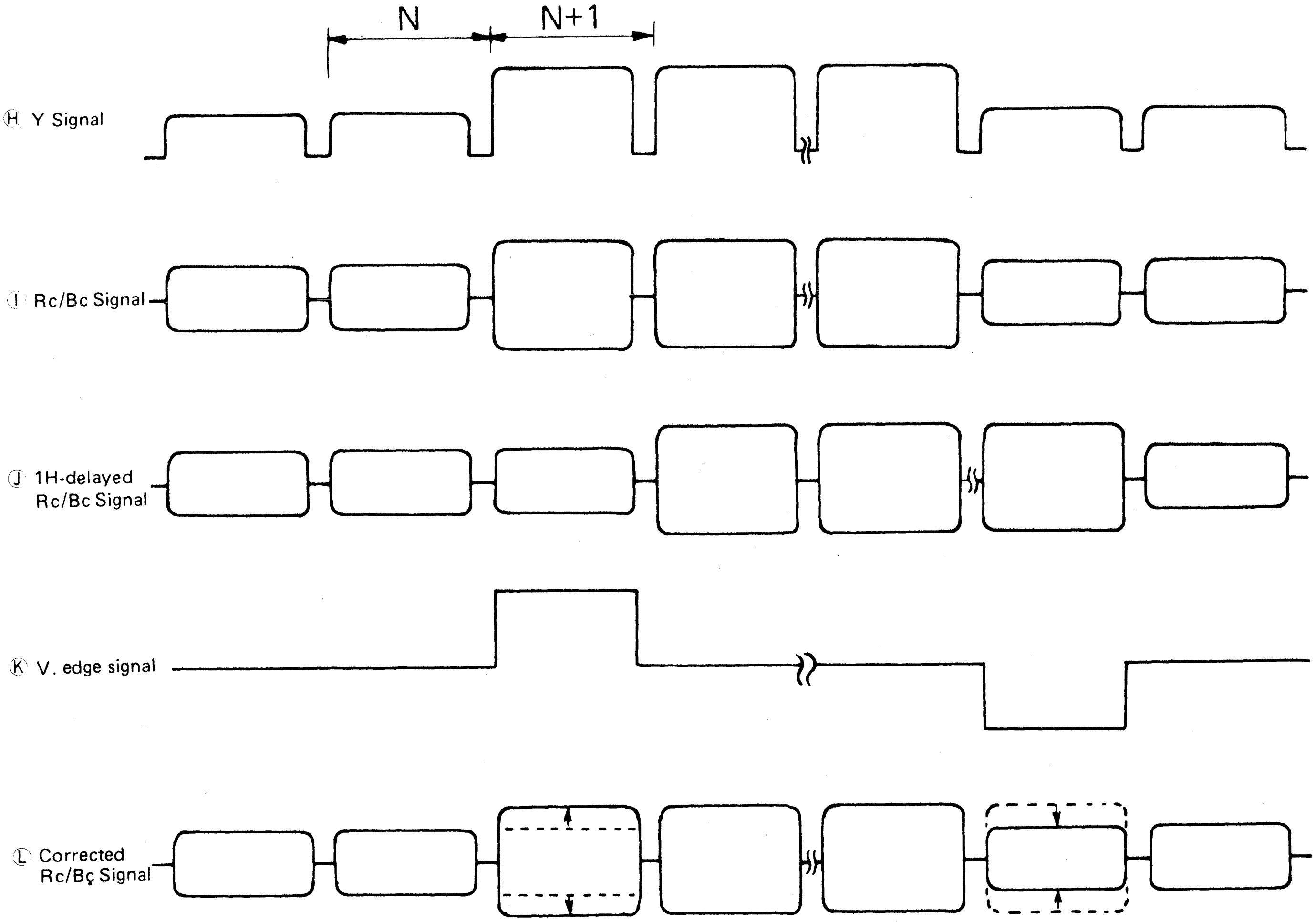


Fig. 4-5-4 Vertical Transient Spurious Correction

4-5-3 Shading Correction Circuit

Outline

Even when dynamic focus is applied to grid-4(G4) of pick-up tube, the non-uniformity of modulation due to uneven focus on the target can not be completely eliminated.
Modulation non-uniformity also occurs due to non-uniform structure in the photoconductive layer of the pick-up tube (manufacture tolerance).
The shading correction circuit compensates for residual picture shading using horizontal(H) and vertical(V) sawtooth and parabola signals written in the FAMOS (EP-ROM) IC.

Details

. Red shading correction

The horizontal shading correction signal obtained at pin 18 of FAMOS IC IC6 and the vertical shading correction signal obtained at pin 6 of IC6 are mixed and supplied to the red shading/tracking correction circuit inside IC4 through pin 22.
Suppose a uniformly illuminated white object is seen by the camera and the Rc signal has a shading (unevenness of amplitude) M . This is sent to the shading/tracking correction circuit from the Rc/Bc separation circuit inside IC4. In this case, the shading correction signal N is written in IC6 in the factory and it is applied to the correction circuit.

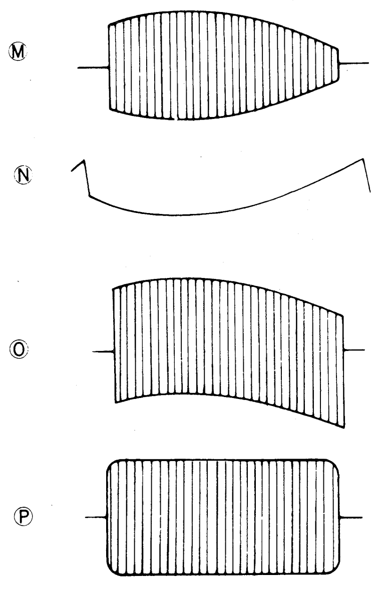


Fig. 4-5-5 Shading Correction

In this case, the four red shading controls are adjusted to generate the shading correction signal N . The Rc signal M is modulated by the shading correction signal N and the corrected signal O is produced. The shading of the Rc signal O is removed in the correction circuit and the Rc signal P is obtained. In this way, the shading of the Rc signal is corrected.
The corrected Rc signal is then fed to the R-Y_L signal circuit inside IC4.

. Blue shading correction

As in the case of red shading correction, the horizontal shading correction signal obtained at pin 17 of IC6 and the vertical shading correction signal obtained at pin 5 of IC6 are mixed and fed to the shading/tracking correction circuit inside IC4 through pin 3, where it modulates the modulated blue(Bc) signal (supplied from the R/B separation circuit) for the shading correction. The shading-corrected Bc signal is then applied to the B-Y_L signal circuit inside IC4.

4-5-4 Correction Signal Generator Circuit

Outline

This circuit generates the bias light shading correction signal, the dynamic focus correction signal and the shading correction signal corresponding to the characteristics of the pick-up tube. These signals are supplied to the respective correction circuit.

. Bias light shading correction signal

The light intensity by the bias light LEDs is not uniform along the entire target surface. Therefore, the bias current which is produced by the pick-up is not uniform, but has a shading A .
As described in the section on the principles of single carrier frequency multiplexing, the red and blue signals are obtained by detecting the modulated signals from the preamplifier output using a band pass filter. Therefore, the red and blue signals are free from bias light shading.
However, the luminance signal is obtained by removing the modulated signal using a trap circuit. Therefore, the luminance signal receives undesirable bias light shading. The bias light shading correction which contains the horizontal sawtooth and parabola signals B to the signal processing circuit to mix it to the preamplifier output signal for correcting color shading at low illumination levels (C).

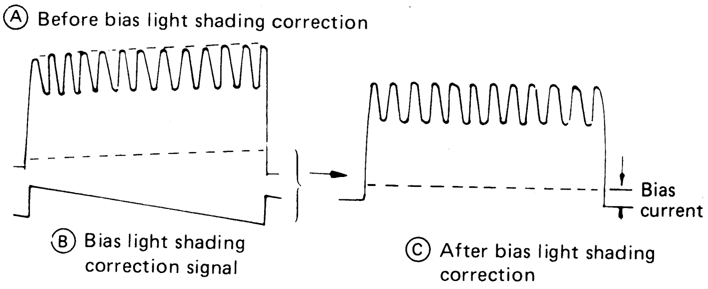

Ⓐ Before bias light shading correction
Bias current
Ⓑ Bias light shading correction signal
Ⓒ After bias light shading correction

Fig. 4-5-6 Bias Light Shading Correction

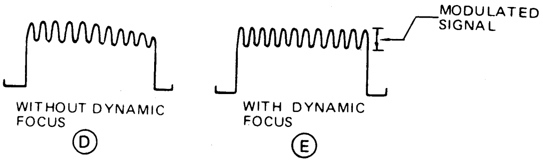

MODULATED SIGNAL
WITHOUT DYNAMIC FOCUS
Ⓓ
WITH DYNAMIC FOCUS
Ⓔ

Fig. 4-5-7 Dynamic Focus Correction

. Dynamic focus correction signal

Generally, the focus voltage which brings the beam in focus in the center part of the pick-up tube is different in level from the voltage which brings the edge portions of the pick-up tube into best focus so that the modulation depth for the center part and the edge portions of the pick-up tube differ. When the camera is directed at an evenly illuminated white object, the red and blue signals modulated at 5MHz do not have a uniform level, and as a result, a color shading appears (D). The dynamic focus correction signal which contains the horizontal and vertical sawtooth and parabola signals is supplied to the pick-up tube's focus electrode (grid-4) together with the DC focus voltage to focus the electron beam along the entire scanning area for correcting unevenness of modulation depth (E).

. Shading correction signal

Even when dynamic focus correction is applied to grid-4 of pick-up tube, the non-uniformity of modulation due to uneven focus on the target can not be completely eliminated.

Modulation un-uniformity also occurs due to non-uniform structure in the photoconductive layer of the pick-up tube (manufacture tolerance).

The shading correction signal which contains the horizontal and vertical sawtooth and parabola signals is fed to the shading correction circuit to compensate for residual picture shading (Refer to Shading Correction Circuit).

Details

The horizontal and vertical shading correction signals of horizontal sawtooth/parabola and vertical sawtooth/parabola signals from pins 18 and 6 of IC6 is fed to pin 22 of IC4 for correcting the red shading. Similarly the horizontal and vertical shading correction signals are supplied from pins 17 and 5 of IC6 to pin 3 of IC4 for correcting the blue shading.

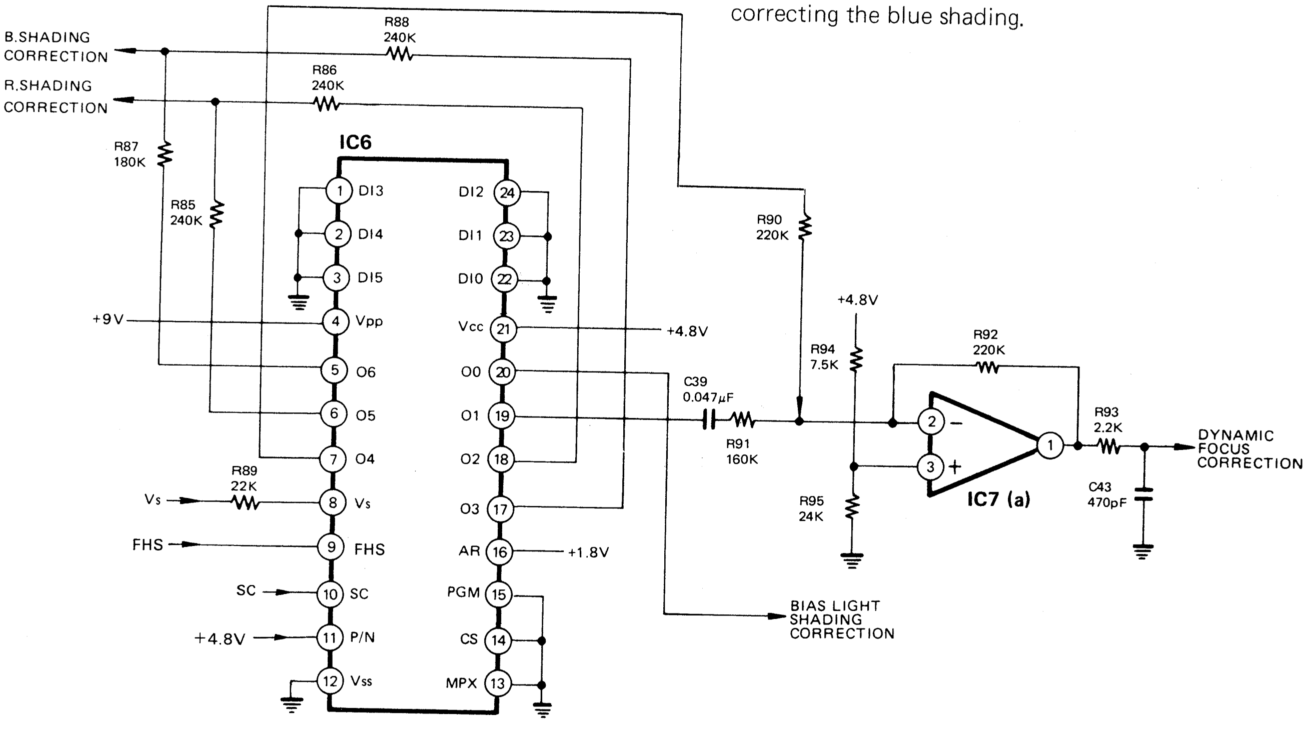

B.SHADING CORRECTION
R.SHADING CORRECTION
R88 240K
R86 240K
R87 180K
R85 240K
IC6
1 DI3
2 DI4
3 DI5
4 Vpp
5 O6
6 O5
7 O4
8 Vs
9 FHS
10 SC
11 P/N
12 Vss
24 DI2
23 DI1
22 DI0
21 Vcc
20 O0
19 O1
18 O2
17 O3
16 AR
15 PGM
14 CS
13 MPX
+9V
R89 22K
Vs
FHS
SC
+4.8V
+4.8V
+1.8V
C39 0.047μF
R91 160K
R90 220K
+4.8V
R94 7.5K
R95 24K
R92 220K
IC7 (a)
R93 2.2K
C43 470pF
DYNAMIC FOCUS CORRECTION
BIAS LIGHT SHADING CORRECTION

Fig. 4-5-8 Correction Signal Generator Circuit

4-5-5 Tracking Correction Circuit

Outline

In this color camera, the red(R) and blue(B) signals moculated at 5MHz (high frequency component) are riding on top of the green(G) signal (low frequency component) when they are extracted from the pick-up tube.

The photoelectric conversion characteristic of the pick-up tube is different between the high frequency component and low frequency component.

The modulation depth of Rc and Bc signals corresponding to the weakly illuminated scene is reduced due to the over-beam in the pick-up tube.

As a result, the R and B signals obtained by detecting the Rc and Bc signals do not track with the Y_L signal. This circuit generates the tracking signals for correcting the characteristic of the R and B signals, and tracks them with the Y_L signal.

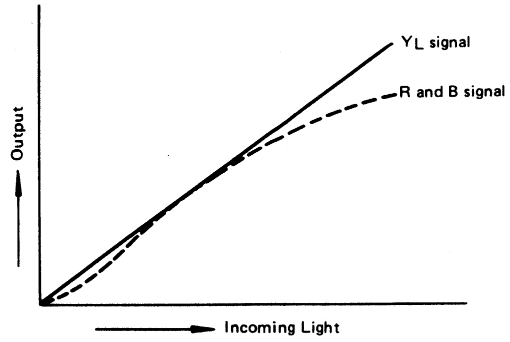


Fig. 4-5-9 Mistracking of YL and R/B Signal

Details

The amplified pre-video signal Q (which contains the modulated red and blue signals as well as the green signal) obtained at pin 24 of IC2 is fed to the low pass filter consisting of L1 and C13, where the 5MHz modulated component is removed and a luminance (Y) signal R is made.

The Y signal R is fed through pin 19 to the tracking signal generator inside IC3 where a tracking-1 signal S, a tracking-2 signal T and a tracking-3 signal U are generated respectively.

The tracking-1 signal S at pin 16 of IC3 is supplied to VR7 (B. TRACKING-1) and VR10 (R. TRACKING-1) for correcting the relatively low level of R and B signals.

The tracking-2 signal T at pin 17 of IC3 is fed to VR6 (B. TRACKING-2) and VR11 (R. TRACKING-2) for correcting the relatively higher portion of R and B signals.

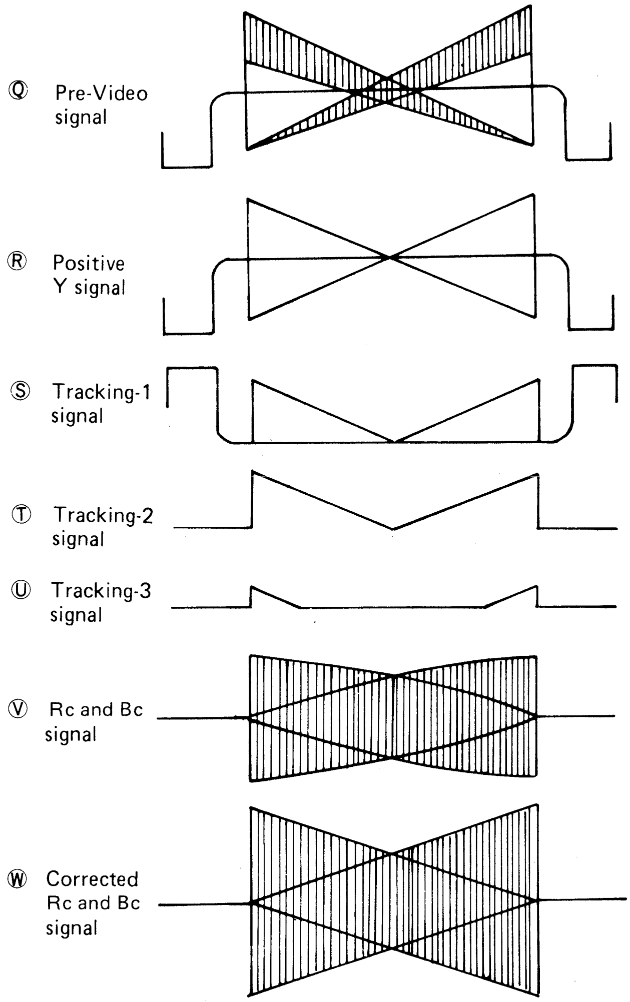


Fig. 4-5-10 Tracking Correction-1

The tracking-3 signal U at pin 15 of IC3 is sent to VR8 (B. TRACKING-3) and VR9 (R. TRACKING-3) for correcting the high level of R and B signals.
These tracking correction signals are supplied through the tracking controls to the R. shading/tracking correction circuit and B. shading/tracking correction circuit inside IC4, where they modulate the Rc and Bc signals V come from the R/B separation circuit for correcting the linearity of Rc and Bc signal W. In this way, the R and B signals match the Y_L signal.

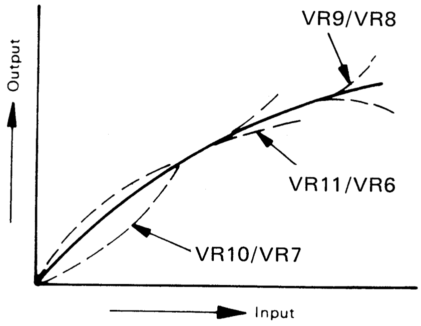


Fig. 4-5-11 Tracking Correction-2

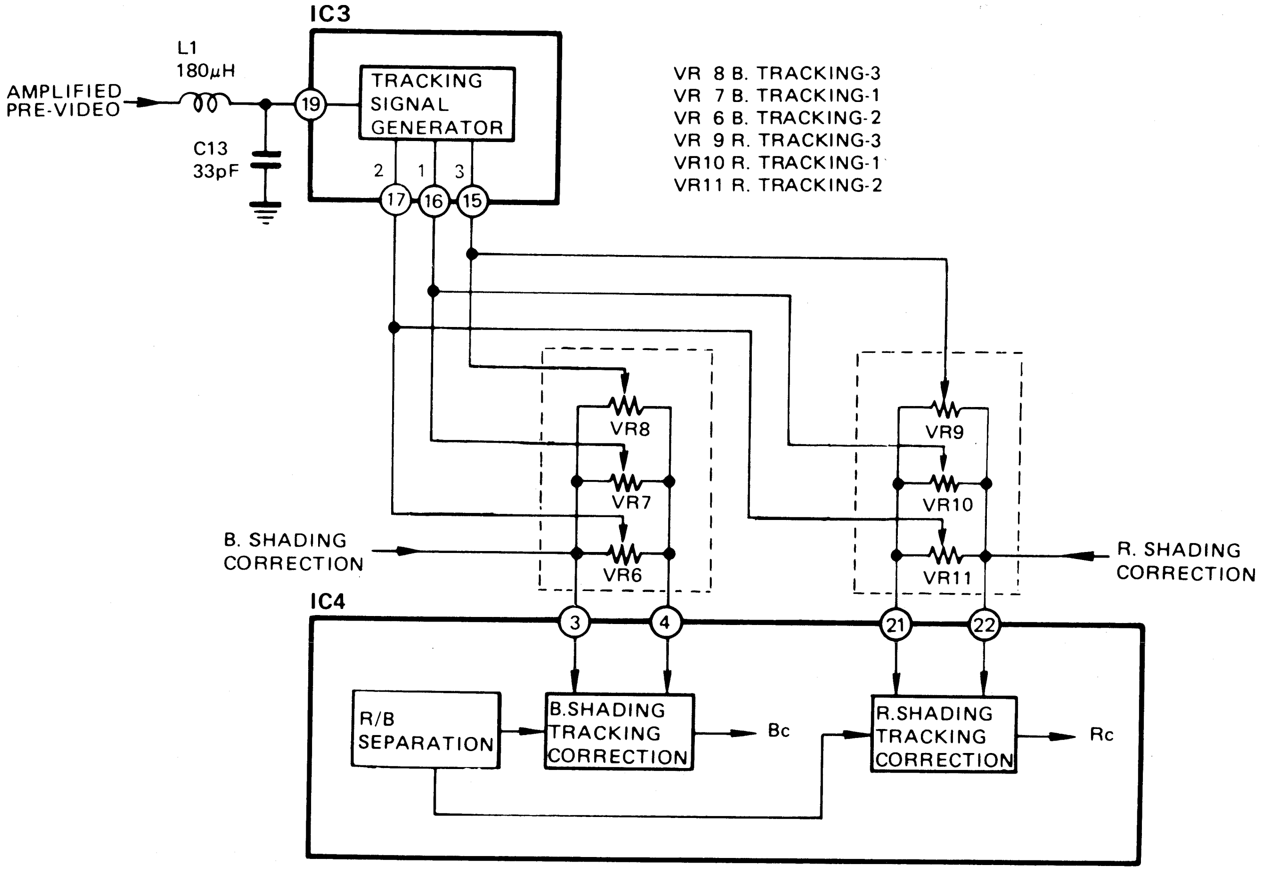

IC3
L1
180μH
AMPLIFIED
PRE-VIDEO
C13
33pF
19
TRACKING
SIGNAL
GENERATOR
2
1
3
17
16
15
VR 8 B. TRACKING-3
VR 7 B. TRACKING-1
VR 6 B. TRACKING-2
VR 9 R. TRACKING-3
VR10 R. TRACKING-1
VR11 R. TRACKING-2
VR8
VR7
VR6
VR9
VR10
VR11
B. SHADING
CORRECTION
R. SHADING
CORRECTION
IC4
3
4
21
22
R/B
SEPARATION
B.SHADING
TRACKING
CORRECTION
Bc
R.SHADING
TRACKING
CORRECTION
Rc

Fig. 4-5-12 Tracking Correction Circuit

4-5-6 R-Y_L Signal Circuit

Outline

This circuit receives the modulated red(Rc) signal from the red shading/tracking correction circuit and detects the red signal. The detected red signal and the Y_L signal supplied from the Y_L signal circuit make the R-Y_L color difference signal. The R-Y_L signal is fed to the chroma encoding circuit.

Details

The Rc signal A from the red shading/tracking correction circuit is fed to the gain control circuit whose gain is controlled for the automatic white balancing. The gain controlled Rc signal is sent to the amplifier through the PRE BL mixing circuit where the noise during the blanking period of Rc signal is removed. The positive Rc signal B and negative Rc signal C are obtained at the output of amplifier and they are forwarded to the detector. The R signal is sent to the low pass filter. The detector which extracts the red signal produces a unwanted 10MHz ripple signal D. The 10MHz component is removed by the low pass filter leaving only the red signal E.

The frequency response of red signal and Y_L signal also become same by the low pass filter.

The detected Rc signal D is then fed to the R-Y_L amplifier. The Y_L signal from the Y_L signal circuit is also supplied to the R-Y_L amplifier where the R-Y_L color difference signal is made up.

The resultant R-Y_L signal is fed through pin 14 of IC4 to the chroma encoding circuit.

The R-Y_L signal at pin 14 of IC4 is fed through R-Y_L matrix Q13 to the Y_H signal circuit and mixed with Y_H signal to compensate for better color reproduction. VR2 (BALANCE) which is located on the side of camera is a control for fine adjustment of the color balance. VR12 (R. GAIN) is a presetting control for the red signal level. VR13 (R. PED) is a control for setting the red pedestal.

SW1 is the Y_L ON/OFF switch for disconnecting the Y_L signal.

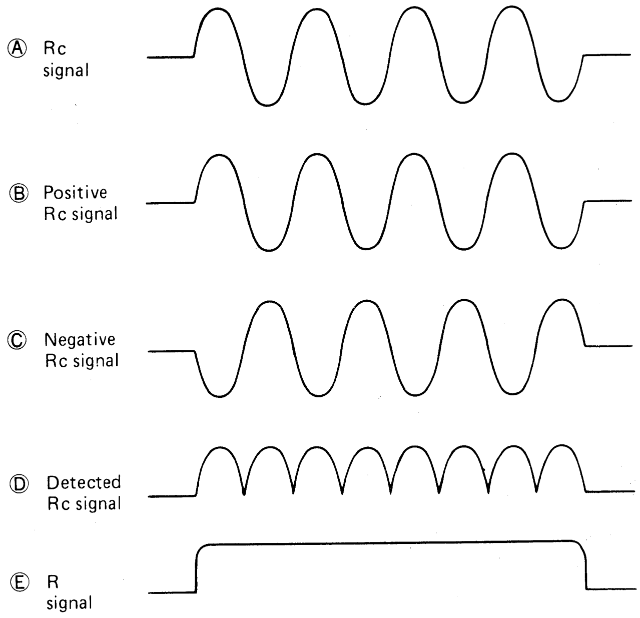

Ⓐ Rc signal
Ⓑ Positive Rc signal
Ⓒ Negative Rc signal
Ⓓ Detected Rc signal
Ⓔ R signal

Fig. 4-5-13 Red Signal Detection

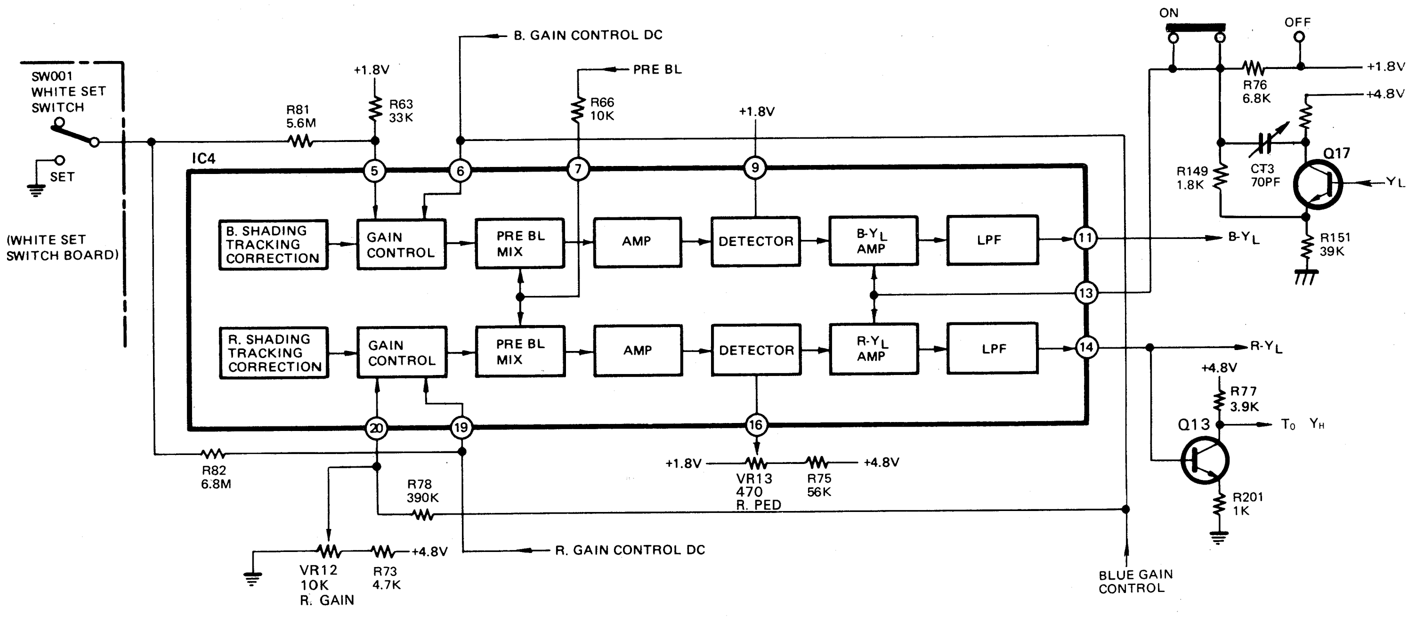

B. GAIN CONTROL DC
PRE BL
SW001 WHITE SET SWITCH
SET
(WHITE SET SWITCH BOARD)
+1.8V
R81 5.6M
R63 33K
R66 10K
+1.8V
IC4
5
6
7
9
B. SHADING TRACKING CORRECTION
GAIN CONTROL
PRE BL MIX
AMP
DETECTOR
B-YL AMP
LPF
11
13
R. SHADING TRACKING CORRECTION
GAIN CONTROL
PRE BL MIX
AMP
DETECTOR
R-YL AMP
LPF
14
20
19
16
R82 6.8M
R78 390K
VR12 10K R. GAIN
R73 4.7K
+4.8V
R. GAIN CONTROL DC
+1.8V
VR13 470 R. PED
R75 56K
+4.8V
BLUE GAIN CONTROL
ON
OFF
+1.8V
R76 6.8K
+4.8V
R149 1.8K
CT3 70PF
Q17
YL
B-YL
R151 39K
R-YL
+4.8V
R77 3.9K
Q13
To YH
R201 1K

Fig. 4-5-14 R-YL/B-YL Signal Circuit

4-5-7 B-Y_L Signal Circuit

Outline

This circuit uses the same design as the R-Y_L signal circuit. The circuit receives the modulated blue(Bc) signal from the blue shading/tracking correction circuit and converts·it to the blue signal. The B-Y_L signal is made by the detected red signal and Y_L signal supplied from the Y_L signal circuit, and fed to the chroma encoding circuit.

Details

The Bc signal from the blue shading/tracking correction circuit in IC4 is sent to B-Y_L amplifier after it undergoes the gain control, the preblanking mixing, the amplification and detection. The B-Y_L signal made by the detected B signal through the low pass filter which removes the 10MHz ripple signal and the Y_L signal is fed to the chroma encoding circuit.

4-5-8 Chroma Clip Signal Circuit

Outline

When the over·input signal level is fed to the amplifier or the beam of pick-up tube is insufficient to discharge the target due to excessive light reflected from a brightly illuminated object, the modulated red/blue signal components riding on to top of the green signal become saturated (G and H).

Therefore, the bright picture parts turn into an unnatural green color due to lack of red and blue.

This circuit receives the luminance(Y) signal and makes the chroma clip signal for clipping the unnatural green color. The chroma clip signal is sent to the chroma encoding circuit.

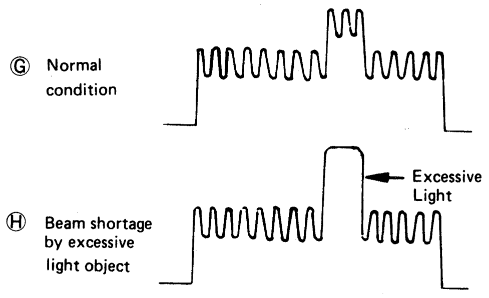

Ⓖ Normal condition
Ⓗ Beam shortage by excessive light object
Excessive Light

Fig. 4-5-15 Beam Shortage

Details

The pre-video signal at pin 24 of IC2 is fed to low pass filter which consists of L1 and C13 and the luminance (Y) signal I is made. The Y signal I is fed through pin 19 of IC3 to the white clip circuit where the high Y signal level J is detected. The detected high Y signal J , signal K delayed 0.5 µs by delay line CF3 and signal L which results from the delayed signal K being reflected back through CF3 and delayed again (1 µs) appear at the input of NAM (non-additive mixing) circuit.

The mixing signal M (J + L) is non-additively mixed with the signal K and a chroma clip signal N is made. The chroma clip signal N is fed from the NAM circuit to the chroma encoding circuit through the pulse separator/buffer and pin 23 of IC3, and to the VIDEO signal processing circuit through R51 together with the positive vertical edge signal comes through R47 (Refer to Vertical Edge Signal Generator Circuit.) to minimize unnatural green color around the bright object.

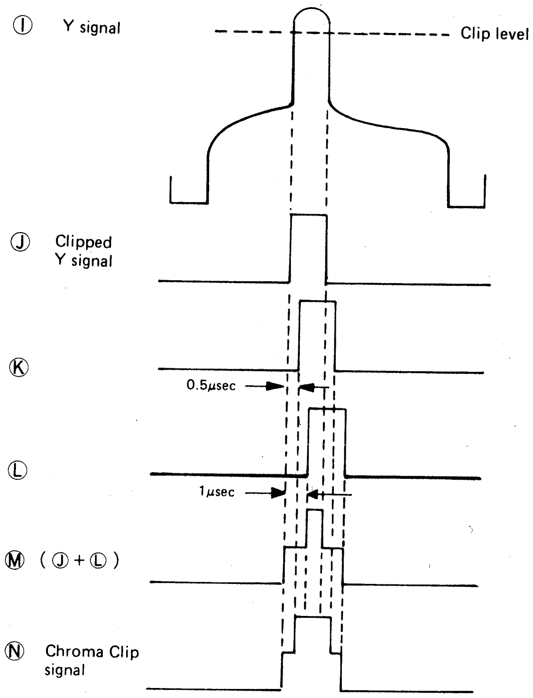

Ⓘ Y signal
Clip level
Ⓙ Clipped Y signal
Ⓚ
0.5µsec
Ⓛ
1µsec
Ⓜ (Ⓙ+Ⓛ)
Ⓝ Chroma Clip signal

Fig. 4-5-16 Chroma Clip Signal

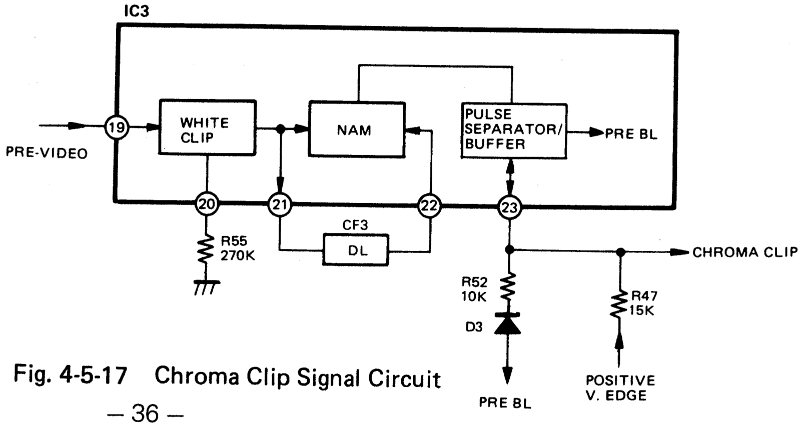

IC3
PRE-VIDEO
19
WHITE CLIP
NAM
PULSE SEPARATOR/ BUFFER
PRE BL
20
21
22
23
R55 270K
CF3
DL
CHROMA CLIP
R52 10K
D3
R47 15K
PRE BL
POSITIVE V. EDGE

Fig. 4-5-17 Chroma Clip Signal Circuit

4-6 Chrominance Encoding Circuit

This circuit contains the +2.5V power circuit, the chrominance signal generator circuit, the chroma clip/suppression circuit and the white set detection circuit.

4-6-1 +2.5V Power Circuit

Outline

This circuit generates the regulated +2.5V DC which is used as power supply for IC10.

Details

+1.8V DC generated inside IC3 is fed through pin 5 and L10 to the emitter of Q21 which is used as a diode. The +2.5V DC obtained at the collector of Q21 is supplied to pin 6 of IC10 as a power supply.

4-6-2 Chrominance Signal Generator Circuit

Outline

This circuit receives the R-Y_L and B-Y_L color difference signals and modulates these base band color difference signal on two subcarrier differing in phase by 90° to generate a chrominance signal. The burst signal is also generated in this circuit.

Details

The R-Y_L color difference signal is fed from the R-Y_L signal circuit in IC4 to the R-Y_L clamp circuit in IC10 through pin 3, where the blanking period of R-Y_L signal is clamped by the clamp pulse-2(CP2) from the pulse separator in IC10. The clamped R-Y_L signal is then supplied to the R-Y_L balance modulator where it is mixed with the burst flag pulse (BFP) applied from the pulse generator circuit through pin 2 of IC10 and clamp circuit. The R-Y_L signal with the burst flag pulse (BFP) modulates the (R-Y) subcarrier applied to the modulator from the pulse generator circuit through pin 14 of IC10. The modulator produces an amplitude modulated (suppressed carrier) signal.

Similarly, the B-Y_L color difference signal is fed from the B-Y_L signal circuit to the B-Y_L balance modulator circuit in IC10 through pin 4 of IC10 and the B-Y_L clamp circuit, where the B-Y_L signal is mixed with the burst flag pulse (BFP) supplied through pin 2 of IC10 and BFP clamp circuit. The B-Y_L signal with the burst flag pulse (BFP) and the (B-Y) subcarrier applied to the modulator through pin 16 of IC10 undergo suppressed carrier amplitude modulation. The R-Y_L modulated signal and the B-Y_L modulated signal is added forming the chrominance signal with the burst. The chrominance signal is then forwarded to the chroma clip/suppress circuit.

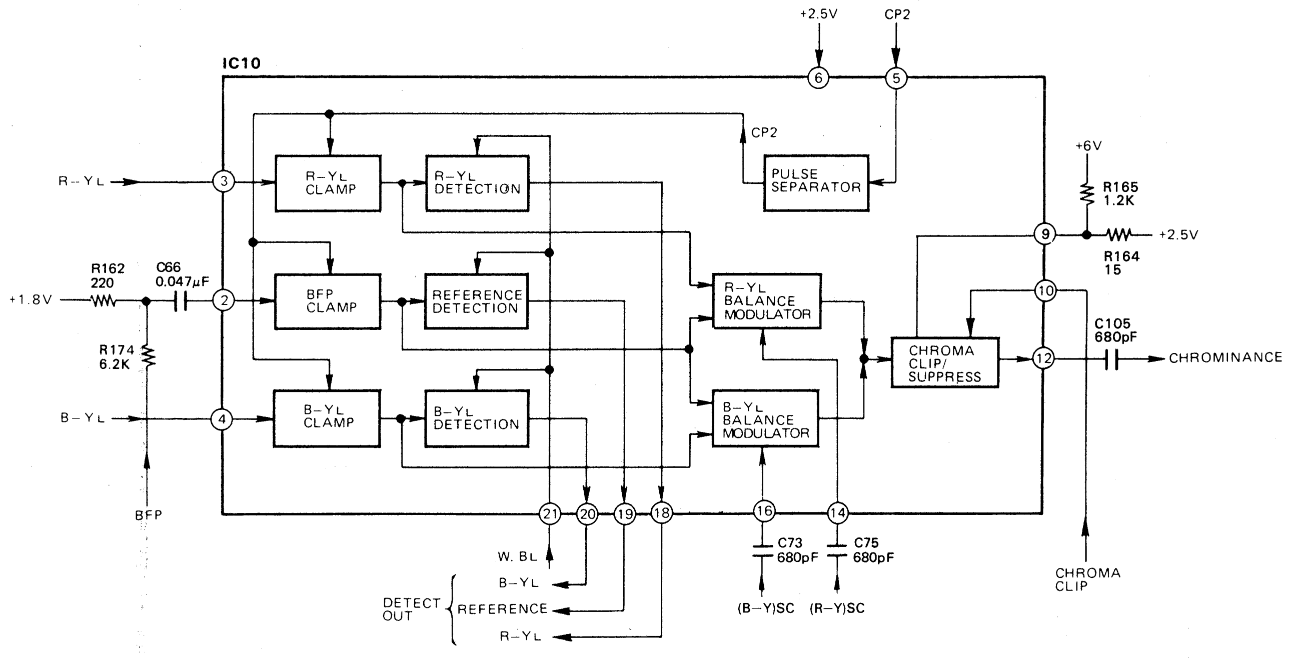

+2.5V
CP2
IC10
⑥
⑤
CP2
PULSE SEPARATOR
+6V
R165 1.2K
+2.5V
R164 15
R-YL
③
R-YL CLAMP
R-YL DETECTION
R162 220
C66 0.047μF
+1.8V
②
BFP CLAMP
REFERENCE DETECTION
R-YL BALANCE MODULATOR
⑨
⑩
C105 680pF
R174 6.2K
CHROMA CLIP/ SUPPRESS
⑫
CHROMINANCE
B-YL
④
B-YL CLAMP
B-YL DETECTION
B-YL BALANCE MODULATOR
BFP
㉑
⑳
⑲
⑱
⑯
⑭
C73 680pF
C75 680pF
W. BL
B-YL
DETECT OUT
REFERENCE
R-YL
(B-Y)SC
(R-Y)SC
CHROMA CLIP

Fig. 4-6-1 Chroma Encoding Circuit

4-6-3 Chroma Clip/Suppress Circuit

Outline

This circuit contains the high Y level chroma clip circuit and low level chroma suppress circuit.
The high Y level chroma clip circuit clips the green color which results when an excessively bright object is shot with the camera. (Refer to Chroma Clip Signal Circuit for details.)
The low level chroma suppression circuit enhances color reproduction in low luminance condition by improving the white balance, when the color of the object is faint.

Details

The chrominance signal with the burst A is supplied to the chroma clip/suppress circuit from the $R\text{-}Y_L$ and $B\text{-}Y_L$ balance modulator circuits. The chroma clip signal B which is made in the chroma clip signal circuit in IC3 is supplied through pin 10 of IC10 to the chroma clip/suppress circuit where the chrominance signal corresponding to the excessive bright object is clipped C and does not reach the video output.
The chroma clip signal also suppresses the chrominance signal around the unnatural green color.

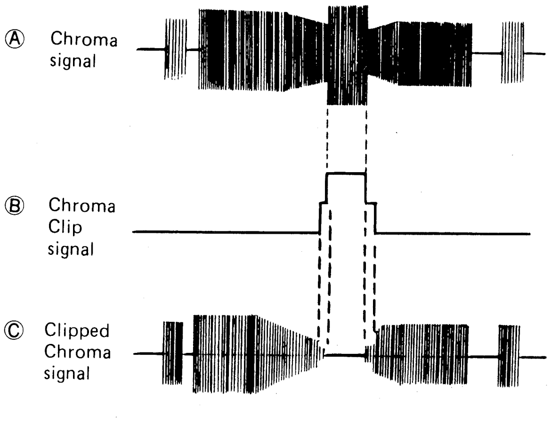


Fig. 4-6-2 Chroma Clip

The DC voltage obtained by dividing the voltage between +6V and +2.5V with R164 and R165, and fed to the chroma clip/suppress circuit through pin 9 of IC10 determines the low suppression level of chroma signal. This DC voltage is applied to the chroma clip/suppress circuit and clips the low chrominance level.

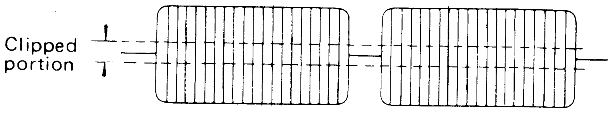


Fig. 4-6-3 Chroma Suppress

4-6-4 White Set Detection Circuit

Outline

This circuit receives the $R\text{-}Y_L$, $B\text{-}Y_L$ and reference DC voltage from the respective clamp circuits and converts them to the DC voltages. The detected DC voltages are sent to the white balance setting circuit.

Details

The clamped $R\text{-}Y_L$, the clamped $B\text{-}Y_L$ and the clamped burst flag pulse (BFP) are respectively fed to the detection circuits and their center portions are gated by the wide blanking (W.BL) pulse supplied through pin 21 of IC10 in order to set the white balance with the signal corresponding to the center image. The clamped burst flag pulse is gated by the W.BL pulse, the burst flag pulse is removed and only the clamp DC voltage is detected as a reference DC voltage. The gated signals are converted into the DC voltage in the detection circuit and fed through pins 18, 19 and 20 of IC10 to the white balance setting circuit.

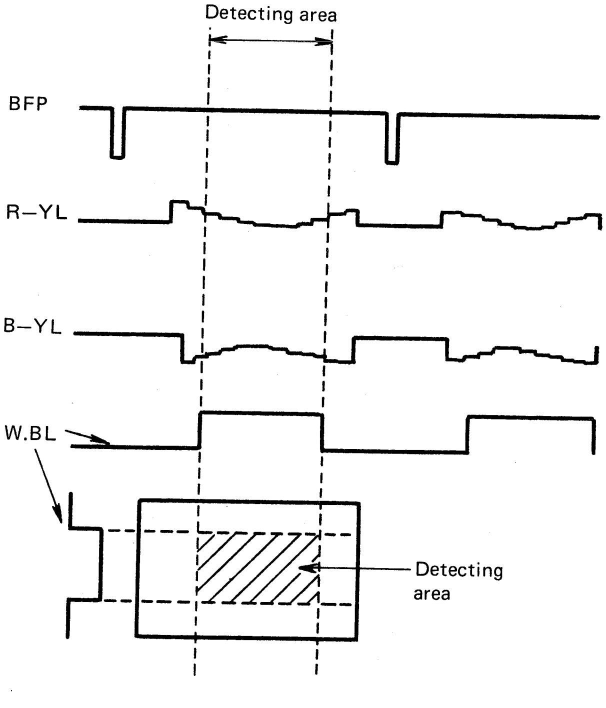


Fig. 4-6-4 White Set Detection

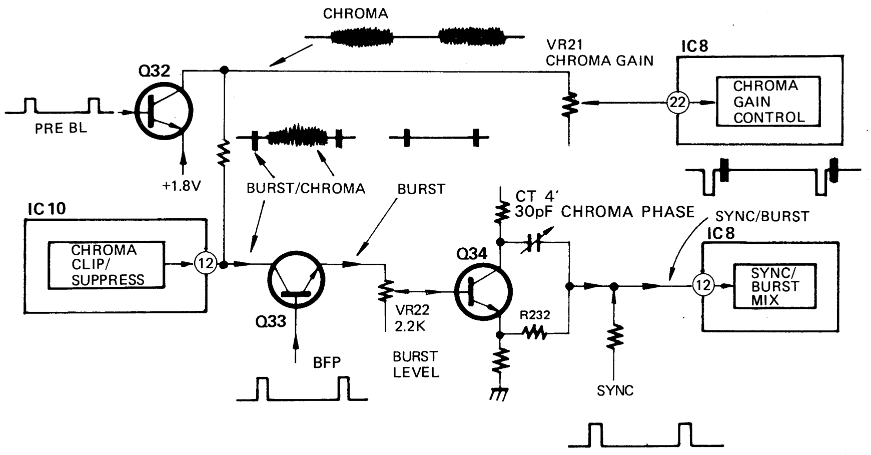

CHROMA
VR21
CHROMA GAIN
IC8
Q32
CHROMA
GAIN
CONTROL
22
PRE BL
+1.8V
BURST/CHROMA
BURST
CT 4'
30pF CHROMA PHASE
SYNC/BURST
IC10
IC8
CHROMA
CLIP/
SUPPRESS
12
Q34
SYNC/
BURST
MIX
12
VR22
2.2K
R232
Q33
BFP
BURST
LEVEL
SYNC

Fig. 4-7 Burst Generator Circuit

4-7 Burst Generator Circuit

Outline

This circuit gates the burst signal from the mixed signal of the chrominance and burst signals supplied from the chroma encoding circuit and phase-shifted burst is generated. The burst signal is fed to the video processing circuit together with the sync signal.

Details

The mixed signal of chrominance and burst signal is fed from pin 12 of IC10 to the collector of burst gate Q33. The burst flag pulse (BFP) is fed from the pulse generator circuit to the base of Q33 to gate the burst signal. The gated burst signal st the collector of Q33 is then fed to phase shifter Q34 through VR22 (BURST LEVEL). The phase-shifted burst signal at the junction point of CT4 (CHROMA PHASE) and R232 is then mixed with the sync pulse comes from the pulse generator circuit. The mixed signal is supplied to video processing circuit to from a composite PAL signal.

4-8 Video Signal Processing Circuit

Outline

In this circuit, the chrominance signal, the luminance signal, the title character signal, the blanking signal, the burst signal and the sync signal are mixed to produce a composite PAL signal.

The negative colored PAL signal and fade-in/out effect are also made in this circuit. The PAL signal is applied to the portable VTR, or a desk-top type VTR through the power supply.

Details

The chrominance signal is supplied fromVR21 (CHROMA GAIN) to the chroma gain control circuit inside IC8 through pin 22. The positive vertical edge signal from the vertical edge signal generator, AGC detect DC signal and the chroma clip signal from the chroma clip signal circuit are mixed together through R47, R44/R46 and R51 and fed via pin 20 to the chroma gain control circuit, where these signals control/ reduce the chrominance signal level of the edge of white object.

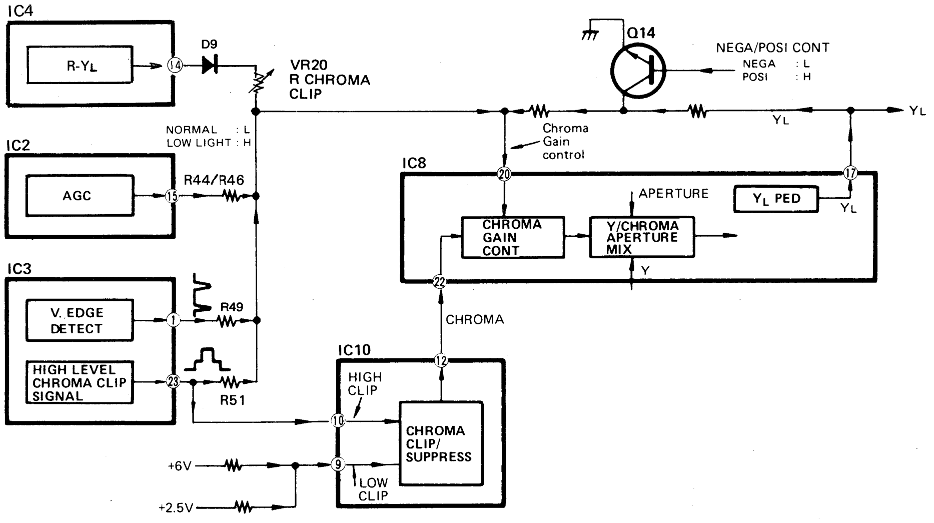

IC4
R-YL
14
D9
VR20
R CHROMA
CLIP
Q14
NEGA/POSI CONT
NEGA : L
POSI : H
YL
YL
NORMAL : L
LOW LIGHT : H
IC2
Chroma
Gain
control
IC8
AGC
R44/R46
15
20
17
APERTURE
YL PED
YL
CHROMA
GAIN
CONT
Y/CHROMA
APERTURE
MIX
Y
22
IC3
V. EDGE
DETECT
1
R49
CHROMA
IC10
HIGH LEVEL
CHROMA CLIP
SIGNAL
23
R51
12
HIGH
CLIP
10
CHROMA
CLIP/
SUPPRESS
+6V
9
LOW
CLIP
+2.5V

Fig. 4-8-1 Chroma Gain Control Circuit

In the chroma clip/suppress circuit previously explained, the green color which results when the excessively bright object is shot with the camera is clipped by the chroma clip signal. (Refer for the detail to Chroma Clip/Suppress Circuit.) The chroma clip signal supplied to the chroma gain control circuit minimizes the remaining chrominance signal corresponding to the excessively bright object.

The vertical transient spurious correction circuit previously described minimizes the unnatural color appears at the vertical edge of object. (Refer for the detail to Vertical Transient Spurious Correction Circuit.) The positive vertical edge signal supplied to the chroma gain control circuit decreases the chrominance signal corresponding to the unnatural color at the vertical edge. The chrominance signal undergoes the chroma gain control is fed to the Y/chroma/aperture mixing circuit inside IC8. The mixed signal of the luminance (Y_H) signal and the vertical(V) edge signal is fed to the Y/CHROMA/APERTURE mixing circuit.

The horizontal aperture signal from the horizontal(H) aperture generator circuit and the H.aperture suppress circuit to the mixing circuit through pin 4 of IC8. In the mixing circuit, these signals are mixed.

The mixed signal is supplied to the fade circuit where its signal level is controlled by the fade control signal supplied from the fade/recording control circuit through pin 24 of IC8. (Refer for the details to fade/recording control circuit.)

Next, the mixed signal is supplied to the NEGA/POSI select circuit.

When the camera is used in the positive picture condition, the high level of nega/posi control signal is fed from the Micro processor board through terminal No. 3 of BI2 and pin 21 of IC8 to the negative/positive select circuit for selecting the positive position and the normal picture is observed.

If the nega/posi select switch on the side of camera is pressed, the nega/posi control signal is converted from the high level to the low level and the negative position is selected. Therefore when the camera is used for shooting the negative film, the normal picture can be observed by pressing the nega/posi select switch on the side.

However, since the color reproduction characteristic of negative film is different, the chrominance signal amplitude corresponding to the high Y level is extremely high. Q14 suppresses the chrominance signal when the camera is used in the negative position. In the negative position, the low level of nega/posi control signal is fed to the base of Q14 turning OFF Q14. When the Q14 is turned OFF, the Y_L signal obtained at pin 17 of IC14 is fed through R128, R125 and pin 20 of IC8 to the chroma gain control circuit where the Y_L signal suppresses the chrominance signal corresponding to the high Y level. In the positive position, the high level is sent to the base of Q14 and Q14 is turned ON. Therefore, the Y_L signal is not fed to the chroma gain control circuit.

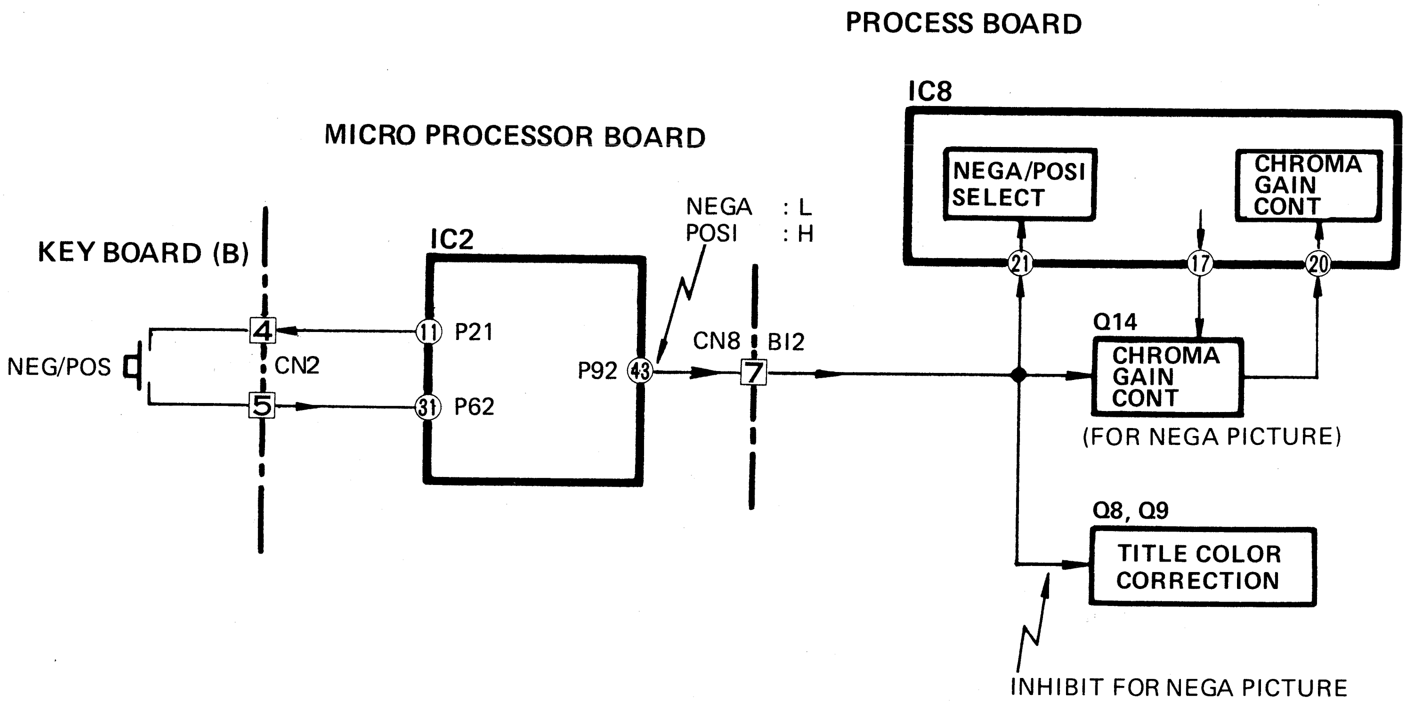


Fig. 4-8-2 NEGA/POSI Select Circuit

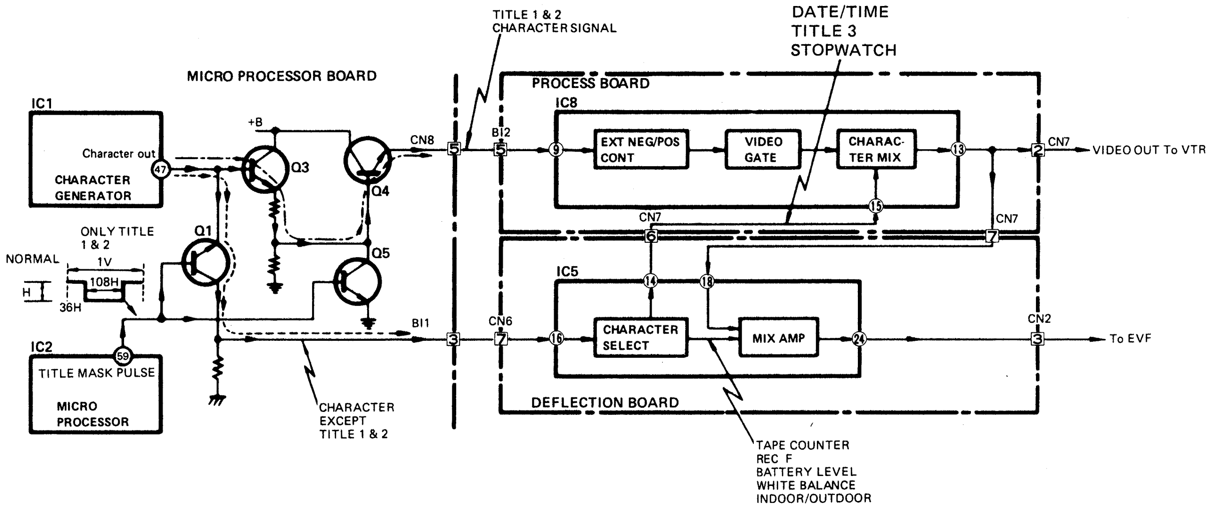

TITLE 1 & 2
CHARACTER SIGNAL
DATE/TIME
TITLE 3
STOPWATCH
MICRO PROCESSOR BOARD
IC1
Character out
CHARACTER GENERATOR
47
+B
Q3
Q4
Q5
Q1
CN8
BI2
PROCESS BOARD
IC8
EXT NEG/POS CONT
VIDEO GATE
CHARAC-TER MIX
CN7
VIDEO OUT To VTR
ONLY TITLE 1 & 2
NORMAL
1V
108H
H
36H
IC2
59
TITLE MASK PULSE
MICRO PROCESSOR
BI1
CN6
IC5
CHARACTER SELECT
MIX AMP
CN2
To EVF
DEFLECTION BOARD
CHARACTER EXCEPT TITLE 1 & 2
TAPE COUNTER
REC F
BATTERY LEVEL
WHITE BALANCE
INDOOR/OUTDOOR

Fig. 4-8-3 Title 1 & 2 Character Signal Circuit-1

The mixed signal is then applied to the title mixing circuit.

The title 1 & 2 character signals generated in Micro processor board is mixed with Y/Chroma signal. The title color/chroma signal is also mixed.

The title 1 & 2 character signal generated in IC1 on Micro processor board and supplied to the character select circuit consisting of Q3,Q4 and Q5 through pin 41 of IC1. The title 1 & 2 character signals are then fed to pin 9 of IC8 on process board to mix with the video signal.

However, title 1 & 2 character signals can only be passed through the character select circuit. The character signals except title 1 & 2 are supplied to character select circuit in IC5 on Deflection board.

At the EXT VIDEO NEG/POS CONT section, the character signal polarity is selected by the external title polarity signal supplied from pin 8 of IC1 on Micro processor board to pin 5 of IC8 on Process board. When the external title polarity signal is high, the output video signal becomes colored title with picture. When the external title polarity signal is changed to low, the keyed picture with backcolor is generated.

The polarity selected character signal is then sent to the video gate circuit in IC8 on Process board.

At the video gate circuit, the Y/Chroma signal is gated/eliminated by the character signal and the title color/chroma signal is then inserted to the part of Y/Chroma signal which is eliminated by character signal.

However, the title color/chroma signal is generated at IC1 on process board and its color is controlled by the title color select DC signal generated at pins 2,3 and 6 of IC1 on Micro processor board. The (R-Y)SC and (B-Y) SC are also supplied from pins 5 and 6 of sync generator IC11 to pins 6 and 7 of IC1 respectively.

The generated title color/chroma signal obtained at pin 9 of IC1 is applied to title color phase shifter consisting of Q2,Q3 and Q30 on Process board and its phase is adjusted by CT1 (TITLE COLOR PHASE) to become specified phase. After that, the title color/chroma signal is fed to pin 10 of IC8, video gate circuit to insert it to Y/Chroma mixed signal.

PIN No. / COLOR	②	③	⑥
WHT (WHITE)	L	L	L
MGT (MAGENTA)	H	L	L
YLW (YELLOW)	L	H	L
CYN (CYAN)	H	H	L
BLU (BLUE)	H	L	H
GRN (GREEN)	L	H	H
RED	H	H	H

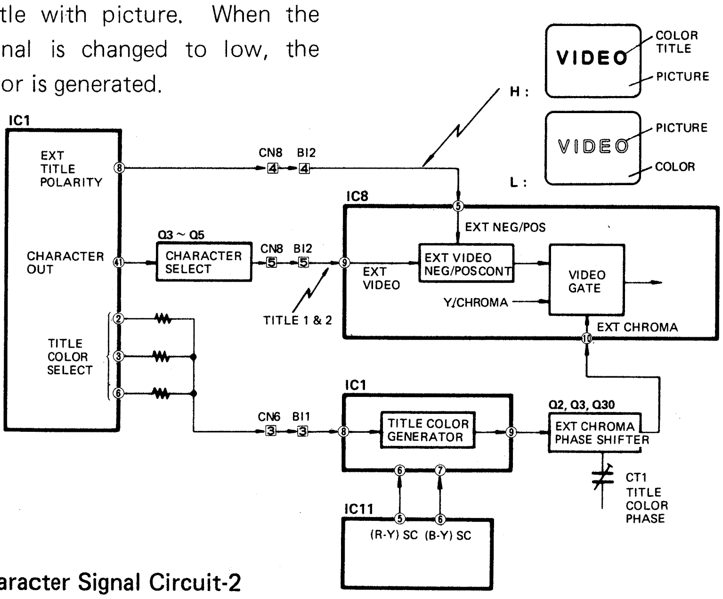

VIDEO
COLOR TITLE
PICTURE
H :
VIDEO
PICTURE
COLOR
L :
IC1
EXT TITLE POLARITY
CN8 BI2
IC8
EXT NEG/POS
CHARACTER OUT
Q3 ~ Q5
CHARACTER SELECT
EXT VIDEO
EXT VIDEO NEG/POSCONT
VIDEO GATE
Y/CHROMA
EXT CHROMA
TITLE 1 & 2
TITLE COLOR SELECT
IC1
CN6 BI1
TITLE COLOR GENERATOR
Q2, Q3, Q30
EXT CHROMA PHASE SHIFTER
CT1 TITLE COLOR PHASE
IC11
(R-Y) SC (B-Y) SC

Fig. 4-8-4 Title 1 & 2 Character Signal Circuit-2

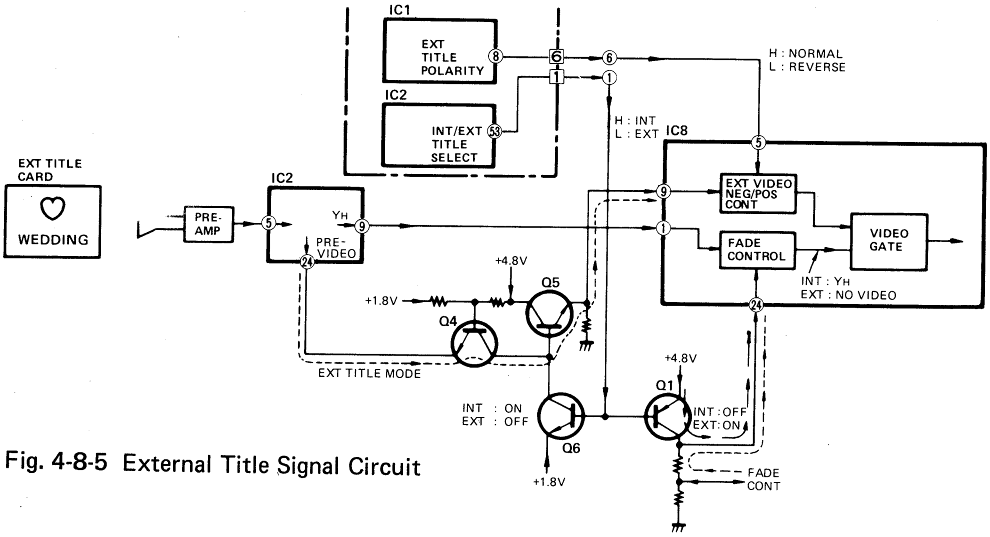

IC1
EXT TITLE POLARITY
IC2
INT/EXT TITLE SELECT
H : NORMAL
L : REVERSE
H : INT
L : EXT
IC8
EXT TITLE CARD
WEDDING
PRE-AMP
IC2
YH
PRE-VIDEO
EXT VIDEO NEG/POS CONT
FADE CONTROL
VIDEO GATE
INT : YH
EXT : NO VIDEO
+4.8V
+1.8V
Q5
Q4
EXT TITLE MODE
+4.8V
Q1
INT : ON
EXT : OFF
INT : OFF
EXT : ON
Q6
+1.8V
FADE CONT

Fig. 4-8-5 External Title Signal Circuit

When the external title (EXT TITLE) mode is selected, the INT/EXT TITLE SELECT signal from pin 53 of IC2 on Micro processor board is changed from high (INT) to low (EXT) and it is supplied to both bases of Q1 and Q6 on Process board so that Q1 is turned ON and Q6 is turned OFF.

The external title video signal from Preamplifier board through pin 5 and 24 of IC2 on Process board is fed to pin 9 of IC8 through Q4 and Q5.

THe external title video signal is then supplied to EXT NEG/POS CONT circuit in IC8 where its polarity is controlled by the external title polarity signal fed from pin 8 of IC1 on Micro processor board through pin 5 of IC8 on Process board.

The external title video signal is then applied to the video gate circuit.

However, YH signal from pin 9 of IC2 on Process board is shut off by the high voltage supplied from the collector of Q1 to pin 24 of IC8 and fade control circuit by turned ON Q1.

Since the circuit designing of video gate circuit in IC8 on Process board, the luminance (Y) signal level of title color signal inserted is always the same level even if the different color is selected.

As a result, especially red and blue title colors become different colors (too high luminance). Therefore, title color correction circuit reduces the luminance level of red and blue title color.

When red or blue title color is selected, the high level of title color correction signal supplied from Micro processor board is fed to the base of Q8 so that Q8 turns OFF and Q9 turns ON. The positive polarity blanking pulse (BL) generated at pin 13 of IC11 is converted into the negative polarity by Q9 and is mixed to the base of Q12 and pin 1 of IC8. The Y signal blanking level at pin 1 of IC8 becomes bigger than that of without correction. The title color signal is then mixed with Y signal whose blanking/pedestal level corrected at the video gate circuit. Next, the negative polarity mixed signal obtained at pin 6 of IC8 and the negative polarity blanking signal are mixed at the base of Q12 to cancel the blanking level which is previously corrected at pin 1 of IC8. As a result, the blanking level of Y signal does not change by title color correction but that of red and blue title color are reduced for produce the better color.

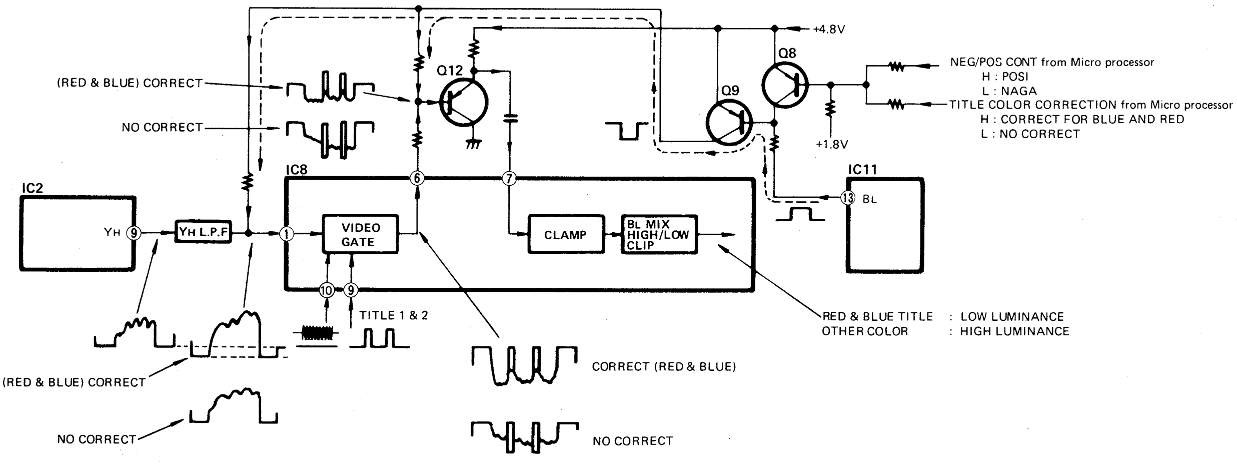

+4.8V
(RED & BLUE) CORRECT
NO CORRECT
Q12
Q8
Q9
NEG/POS CONT from Micro processor
H : POSI
L : NAGA
TITLE COLOR CORRECTION from Micro processor
H : CORRECT FOR BLUE AND RED
L : NO CORRECT
+1.8V
IC11
BL
IC2
YH
YH L.P.F
IC8
VIDEO GATE
CLAMP
BL MIX HIGH/LOW CLIP
TITLE 1 & 2
RED & BLUE TITLE : LOW LUMINANCE
OTHER COLOR : HIGH LUMINANCE
CORRECT (RED & BLUE)
(RED & BLUE) CORRECT
NO CORRECT
NO CORRECT

Fig. 4-8-6 Title Color Correction Circuit

The mixed signal is then fed to the character mix circuit where the characters/graphics signals such as subtitle, stopwatch and date superimposed into the PAL signal. The characters/graphics signals are sent from the Deflection board through pin 15 of IC8. The mixed signal is forwarded through pin 6, Q12 and pin 7 of IC8 to the clamp circuit, where the blanking level of the mixed signal is clamped by the clamp pulse-2 (CP2) supplied from the pulse separator inside IC8. The clamped signal is then sent to the BL mix/high clip/low clip circuit, where it is mixed with the blanking (BL) pulse.

The high clip circuit clips the signal exceeds 0.85V and the low clip circuit clips the low level portion of mixed signal for setting the pedestal level. The mixed signal of chrominance and luminance signals which undergoes the high and low clip is mixed with the mixing signal of sync and burst signal in the video output circuit forming a composite PAL signal.

The PAL signal at pin 13 of IC8 is supplied to the VTR. The PAL signal is also supplied to 4.43MHz trap CF6 where the chrominance signal is removed and the luminance signal remains. The luminance signal is then fed to the electronic viewfinder through the Deflection board.

4-9 Playback Detect Circuit

Outline

This circuit detects the recording or playback mode of the portable VTR and sends the detected information to the Audio/Lens control board.

When the portable VTR is set into the recording mode, camera supplies the PAL output signal to the viewfinder and the portable VTR for recording.

When the portable VTR is set into the playback mode, the playback control signal shuts OFF the camera function and supplies the playback video signal from VTR to the viewfinder and close lens iris to protect pick-up tube from burning.

Details

When the portable VTR is set into the recording mode, no DC voltage is applied through R113 to the base of Q11 so that Q11 and Q10 turn OFF. The low level obtained at the collector of Q10 is fed to the anode of D7 and D7 turns OFF. Therefore, the video output circuit works properly and sends the video signal to the viewfinder and the portable VTR for recording.

When the portable VTR is set into the playback mode, the playback video signal which rides on top of +6V DC is supplied from the VTR through terminal No. 2 of CN9. The playback signal is removed by C46 and the remaining +6V DC is fed to the base of Q11 so that Q11 and Q10 turn ON.

The high level obtained at the collector of Q10 is fed to the anode of D7 turning ON D7.

The high level is supplied to the video output circuit to shut it OFF. In this way the video signal is not generated in the camera and only playback signal from the portable VTR is supplied to the viewfinder through trap CF6.

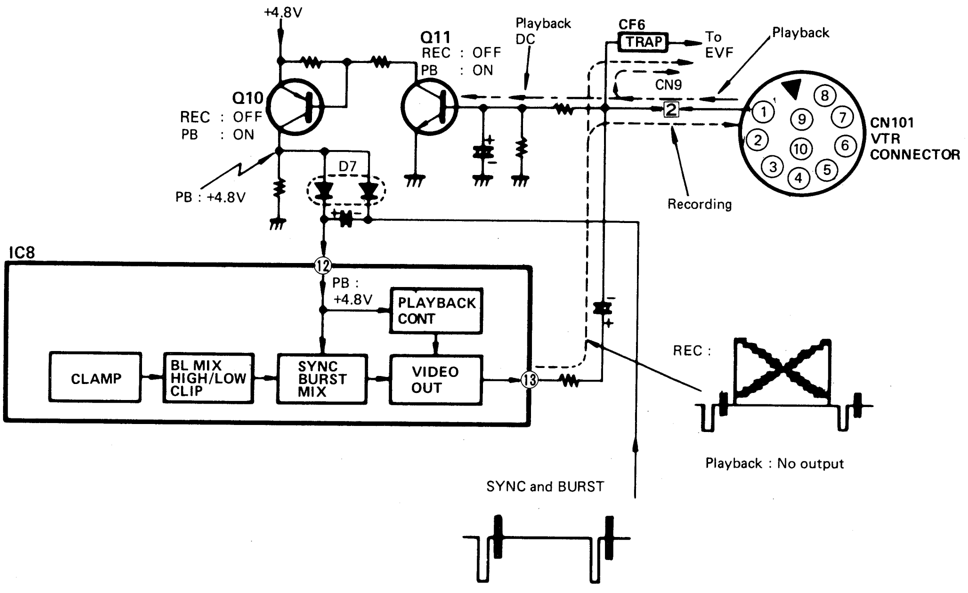


Fig. 4-9 Playback Detect Circuit

4-10 White Balance Setting Circuit

Outline

This circuit automatically sets the white balance of picture by controlling the amplitude of red and blue signals respectively. (Proper white balance or color balance means that the camera will reproduce a white object in the picture as white.)

Since the scene illumination contributes to color in balance, a diffusion filter is placed between the lens and the pick-up tube when the white set switch is placed in the SET position. Therefore, white setting uses the same light as will be used later.

When the SET position is chosen, the automatic cycle in the camera increases or decreases R and B signals in step and stops when each of these levels is equal to the green (Y_L) level. At this point, the R-Y_L and B-Y_L signals are both 0(zero), the picture is white and white balance has been achieved.

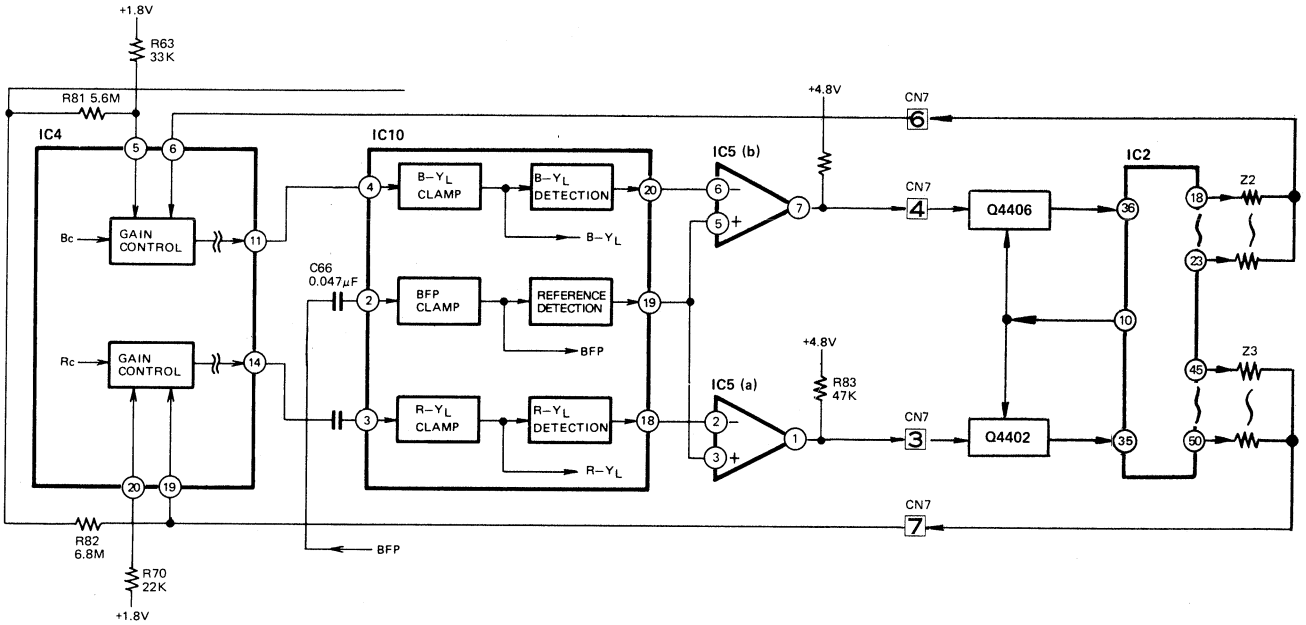
This is indicated by the graphics displayed in the viewfinder. The blinking graphics WHITE will be displayed after the power switch is turned ON and while the white balance is being set. The graphics WHITE BAL OK is displayed or blinking WHITE disappears when the automatic white balance process is finished.

Details

The DC voltage obtained at pin 8 of Z4 and pin 8 of Z1 are supplied to the gain control circuit in the R-Y_L and B-Y_L signal circuits through pin 7 and pin 6 of CN7 to set the initial gain of R and B signals respectively. As a result, the R signal and B signal levels are set and camera will produce average white balance for 3200°K illumination when the power is first applied.

At this time, the blinking graphics WHITE is displayed on the viewfinder. When the graphics are displayed, the white balance should be set by placing the white set switch SW1 on the side of camera to the SET position while aiming the camera at the white object or white paper.

When the white set switch SW1 is placed to the SET position, pin 1 of IC3 is connected to ground, the 6-bit up/down counters start counting up or down depending on the levels at pin 2 and pin 7 of IC4. As the counters count up or down the digital/analog (D/A) converter consisting of Z3/Z4 and Z1/Z2 produce staircase signals. The voltage levels of these D/A converter will set the R and B gain.



+1.8V
R63 33K
R81 5.6M
IC4
5
6
Bc
GAIN CONTROL
11
Rc
GAIN CONTROL
14
20
19
R82 6.8M
R70 22K
+1.8V
IC10
C66 0.047μF
4
B-YL CLAMP
B-YL DETECTION
20
B-YL
2
BFP CLAMP
REFERENCE DETECTION
19
BFP
3
R-YL CLAMP
R-YL DETECTION
18
R-YL
BFP
+4.8V
IC5 (b)
6
5
7
+4.8V
IC5 (a)
R83 47K
2
3
1
CN7
6
CN7
4
CN7
3
CN7
7
Q4406
Q4402
IC2
36
10
35
Z2
18
23
Z3
45
50

Fig. 4-10 White Balance Setting Circuit

These DC voltages are sent to the gain control circuit in IC4 and control the R and B signal levels which was initially set for 3200°K illumination. As the increasing or decreasing voltages made by the stairsteps raise the gain of R and B channels, the levels of R-Y_L and B-Y_L signal increase or decrease at pins 14 and 11 of IC4. To determine for the up/down counters counting up or down, an Op-amp for each channel (IC5 pins 5, 6, 7 for blue, pins 1, 2, 3 for red) compares the detected signal levels (DC) which appear at IC10 (pin 18 : R-Y_L detected DC, pin 20 : B-Y_L detected DC, pin 19 : reference detected DC). The outputs of comparison at pin 7 and pin 1 of IC5 are sent to the micro processor through pins 3 and 4 of CN7.

The output of comparator at pin 7 is high when the R signal level is below the Y_L signal (The R-Y_L detected DC level is below the reference detected DC level.), and the counter starts counting up.

The increased DC voltage from the D/A converter is fed to the red gain control circuit to increase the red signal level.

When the R signal just exceeds the Y_L signal, the comparator switches its output to low and the counter starts counting down. The decreased DC voltage reduces the R signal level. This loop works until the R signal level is equal to the Y_L signal. The B channel works in a similar fashion.

The counters stop counting automatically about 3 seconds after the white set switch SW1 is placed to the SET position and white balance has been achieved. At the same time, the blinking graphics WHITE goes OFF from the viewfinder or the graphics WHITE BAL OK are displayed.

Since the diffusion filter has itself an inherent color filtering effect, the white balance shifts slightly when the white setting is accomplished and diffusion filter is removed. When in the white set mode, the gains of gain control circuits for the R and B signal are slightly shifted by grounding the R82 and R81 and the white balance is set. When the white setting is accomplished and the white set switch is placed in the normal mode the gains are returned to the previous mode for an almost exact match.

4-11 VTR Remote Control/Fade Control Circuit

This circuit consists of the VTR remote control circuit and the fade control circuit.

4-11-1 VTR Remote Control Circuit

Outline

This circuit generates VTR start/stop (pause) control signal. When the VTR is set to the recording mode, the VTR is started by a high potential from this circuit. If a low potential is sent to the VTR, it stops (pauses). This circuit also has the VTR compatibility switch for other VTR which is started by a low potential and stopped by a high potential.

Details

When the VTR compatibility switch SW3 is set in the + (normal) position and the VTR is set in the recording mode if the power switch is turned ON, the potential at pin 17 and pin 19 of IC1 are set to high respectively by the reset pulse supplied to pin 7 of IC1 from Micro processor. The high at pin 17 is fed to the Micro processor board and the graphics REC is not displayed in the viewfinder.

The high at pin 51 of IC2 (Micro Processor) is supplied to the base of Q13 so that Q13 turns ON. The low obtained at the collector of Q13 is supplied to VTR through pin 6 of camera cable to set the VTR to REC/PAUSE mode.

When the non-lock type VTR start/stop switch SW701 is depressed (refer to 1ST TRIGGER), the negative trigger pulse is generated. It is fed to pin 1 of IC4 through Q17. The low at pin 51 of IC2 is fed to Q13 and the high at the collector of Q13 is fed to the VTR to start recording.

At the same time, the low at pin 17 of IC1 is sent to the Micro processor board and the blinking graphics REC is displayed in the viewfinder.

When the subsequent trigger pulse is sent to pin 1 of IC4 by depressing SW701 again (refer to 2ND TRIGGER), the potential at pin 51 of IC2 and pin 17 of IC1 is inverted. As a result, the VTR is stopped and the blinking REC graphics go OFF.

The VTR compatibility switch SW1 inverts the potential of VTR recording control signal at pin 51 of IC2 for other VTR which starts with low potential and stops with high potential.

When the portable VTR is set to the playback mode, an inhibit (Tally) signal (high level) from the VTR is supplied to pin 37 of IC2 to inhibit the trigger pulse from the VTR start/stop switch SW701. Therefore, the REC graphics are not displayed in the viewfinder. This condition is maintained until the playback mode is released and set to the recording mode again.

When the standby switch on the side of the camera is set to the standby mode, the high potential is fed to the base of Q21 from the collector of Q12 for setting the potential at pin 6 of VTR cable to low. Also the high potential at the collector of Q12 is supplied to pin 5 of camera cable through Audio/Lens Control board to set the VTR to standby mode. The condition is maintained until the standby switch is reset to the ON position.

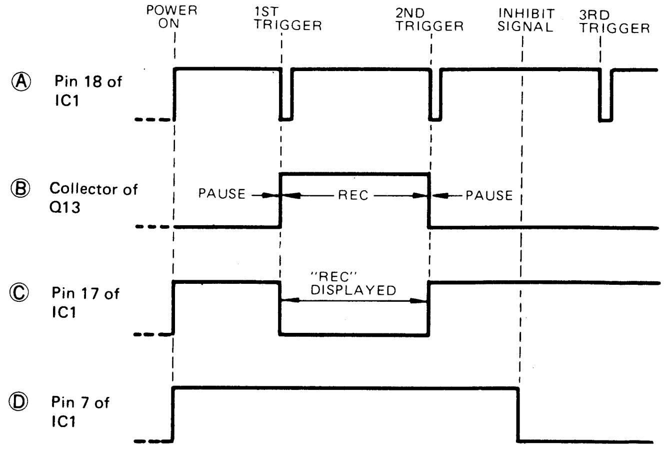


Fig. 4-11-1 VTR Remote Control

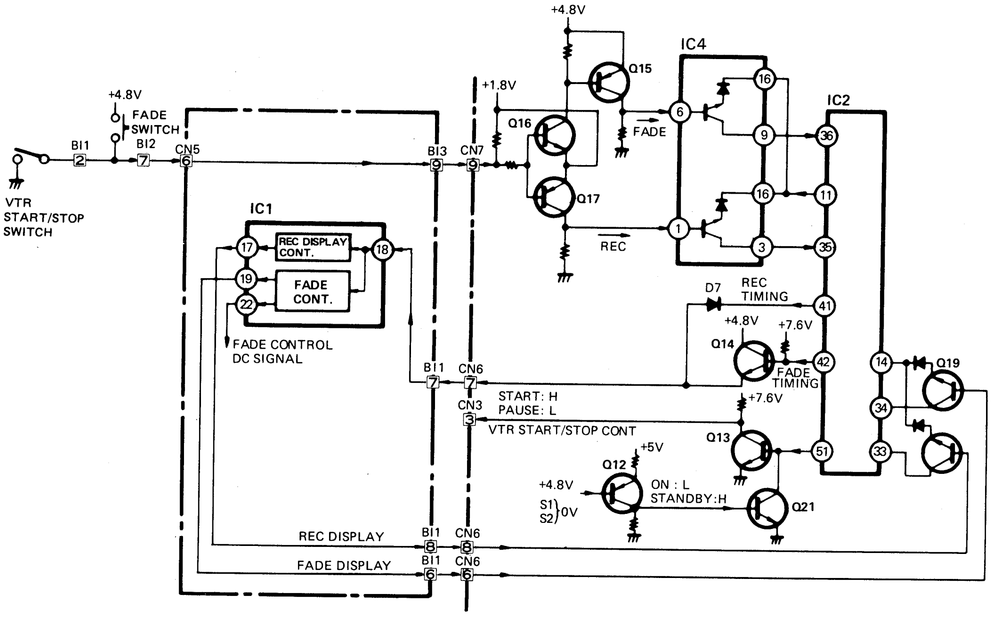

+4.8V
IC4
Q15
+1.8V
IC2
+4.8V
FADE SWITCH
BI1
BI2
CN5
BI3
CN7
Q16
FADE
Q17
VTR START/STOP SWITCH
IC1
REC DISPLAY CONT.
FADE CONT.
REC
D7
REC TIMING
+4.8V
+7.6V
Q14
FADE TIMING
Q19
FADE CONTROL DC SIGNAL
BI1
CN6
START: H
PAUSE: L
CN3
+7.6V
VTR START/STOP CONT
+5V
Q13
Q12
+4.8V
S1
S2
0V
ON : L
STANDBY:H
Q21
REC DISPLAY
FADE DISPLAY

Fig. 4-11-2 VTR Remote Control/Fade Control Circuit

4-11-2 Fade Control Circuit

Outline

This circuit generates the fade control signal and sends it to the video signal processing circuit and Audio circuit to control the fade-in/out effects.

When the VTR is in recording mode, if the VTR start/stop switch is depressed after pressing the fade switch, the fade-out effect is obtained and the VTR pauses, then the picture appears again.

If the VTR is in pause, depressing the VTR start/stop switch after pressing the fade switch, the video will fade out, the VTR starts recording and the video fades in again.

If the VTR start/stop switch is depressed without pressing the fade switch, no fade effect occurs and the VTR is remote-controlled as described in VTR remote control circuit.

Details

. Fade-in effect

When the momentary fade switch SW2 is depressed (E , 1ST TRIGGER), the DC level at pin 18 of IC1 becomes high. This high level initiates the fade/rec control circuit in IC1. This trigger signal E changes the potential at pin 19 of IC1 from high to low J . The low level is fed to the Micro processor board and the graphics F is displayed in the viewfinder. Then when the VTR start/stop switch SW701 is depressed (F , 1ST TRIGGER), pin 18 of IC1 goes low and the DC level at pin 22 starts increasing gradually (H).

After about few seconds the potential at pin 51 of IC2 (Micro Processor) becomes low (L) and the collector of Q13 becomes high to set the VTR starts recording. The potential at pin 17 of IC1 goes low (K) and it is fed to the Micro processor board to display the blinking graphics REC in the viewfinder. Simultaneously the DC level at pin 22 starts decreasing gradually. This DC level H at pin 22 is fed to the fade control circuit in the video signal processing circuit to control the video signal level (I).

This means that the VTR start/stop switch is pressed, the video signal is decreased gradually at first and then appears again gradually (fade-in effect) after recording starts. Therefore the recording proceeds as shown M .

When the fade-in effect is completed, the potential at pin 19 of IC1 is changed from low to high (J) and the graphics F goes OFF.

If the VTR start/stop switch SW701 is depressed independently after fade-in effect is accomplished (F , 2ND and 3RD TRIGGER), the VTR can be controlled remotely as previously described in VTR remote control circuit.

If the fade switch SW2 is depressed again after it is initially pressed (E , 3RD and 4TH TRIGGER), the initial setting for fade effect will be cancelled.

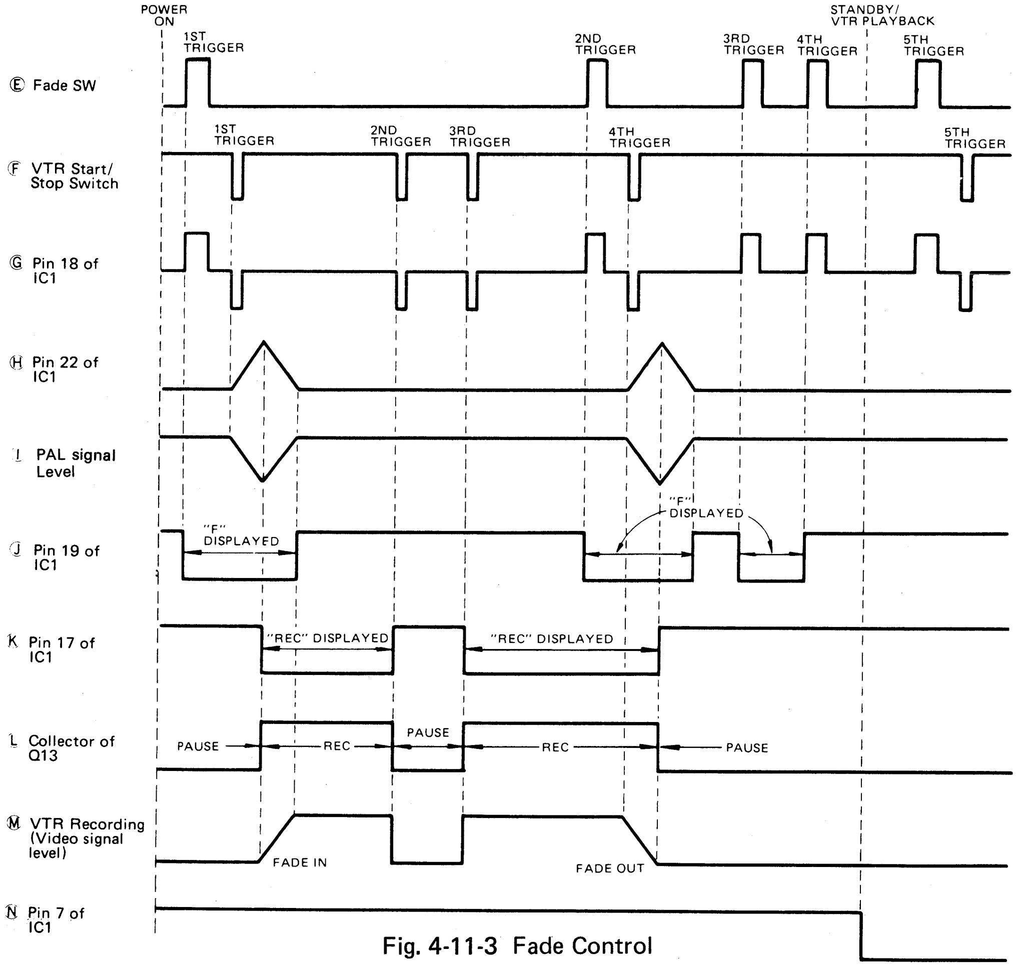
. Fade-out effect

As in the case of fade-in effect, if the VTR start/stop switch SW701 is depressed (F , 4TH TRIGGER) after pressing the fade switch SW2 (E , 2ND TRIGGER), the DC level at pin 22 of IC1 starts increasing gradually to fade-out the video. After few seconds, the potential at pin 51 of IC2 (Micro Processor) changes from low to high and VTR stops (pauses). This DC level decreasing gradually at pin 22 is fed to the fade control circuit to control the video signal level.

When the VTR start/stop switch is pressed after depressing the fade switch, the picture disappears at first (fade-out effect), VTR pauses and then the picture appears again gradually for next recording.

When the VTR stops, both the graphics REC and F disappears from the viewfinder.

When the portable VTR is set to the playback mode or the standby switch is set to the standby position, pin 7 of IC1 becomes low and the fade/rec control circuit is reset as described in VTR Remote Control Circuit. Therefore the fade/rec control circuit is not controlled by depressing the VTR start/stop switch and the fade switch.



POWER ON
STANDBY/ VTR PLAYBACK
1ST TRIGGER
2ND TRIGGER
3RD TRIGGER
4TH TRIGGER
5TH TRIGGER
E Fade SW
1ST TRIGGER
2ND TRIGGER
3RD TRIGGER
4TH TRIGGER
5TH TRIGGER
F VTR Start/ Stop Switch
G Pin 18 of IC1
H Pin 22 of IC1
I PAL signal Level
J Pin 19 of IC1
"F" DISPLAYED
"F" DISPLAYED
K Pin 17 of IC1
"REC" DISPLAYED
"REC" DISPLAYED
L Collector of Q13
PAUSE
REC
PAUSE
REC
PAUSE
M VTR Recording (Video signal level)
FADE IN
FADE OUT
N Pin 7 of IC1

Fig. 4-11-3 Fade Control

5 Micro Processor Board (YFVPKA2004EA)

5-1 Micro Processor 48
5-2 Input Interface 53
5-3 Character Generator 53

5-1 Micro Processor

Outline

The micro processor IC2 generates the programmed key scan pulse signals from the output ports of IC2 and receives these signals at the input ports of IC2 through the input interface circuits.

According to the input signals, the micro processor IC2 supplies the instructional signals to the character generator IC1 and also transmits or receives serial data from/ to VTR for VTR remote control and displaying characters.

Serial data transmission

When the portable color video camera WV-200 is used with the portable video cassette recorder NV-100, the serial data transmission system is performed between the both equipments through 10 pin VTR connector.

The signals which are exchanged between the two equipments through 10 pin connector is as shown in Fig. 5-1-1.

Pin	CAMERA	DIRECTION
1	Video OUT (REC) Video IN (P.B)	VTR ←→ CAMERA
2	GND for pin 1	VTR → CAMERA
3	Serial Data IN/OUT	VTR ←→ CAMERA
4	Serial Clock IN	VTR → CAMERA
5	STANDBY Ⓗ / AUDIO (CH2 (R)) OUT	VTR ← CAMERA
6	CAMERA PAUSE Ⓛ	VTR ← CAMERA
7	Audio (CH1 (L)) OUT	VTR ← CAMERA
8	GND for Audio	VTR → CAMERA
9	GND for pin 10	VTR → CAMERA
10	+12V	VTR → CAMERA

Fig. 5-1-1 10 pin Connector Signal

The serial clock signal is a reference signal which is used to control the timing of the data transmission between camera and VTR.

The serial clock signal is produced by VTR's micro processor and supplied to camera's micro processor IC2 as shown in Fig. 5-1-2.

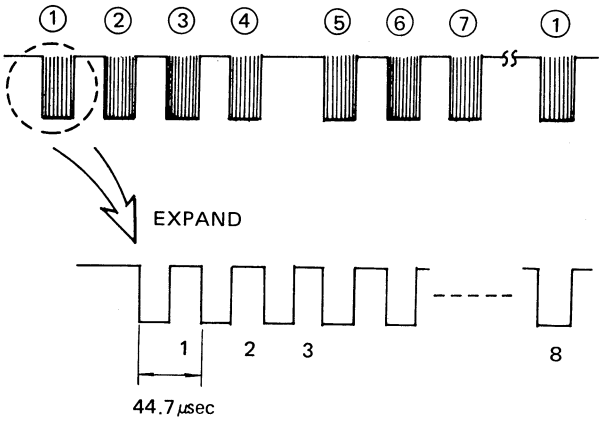


Fig. 5-1-2 Serial Clock

The serial clock signal has seven transmissions, and each transmission consists of 8 bit pulses.

During each transmission, the 8 bit serial data is exchanged as shown in Fig. 5-1-3.

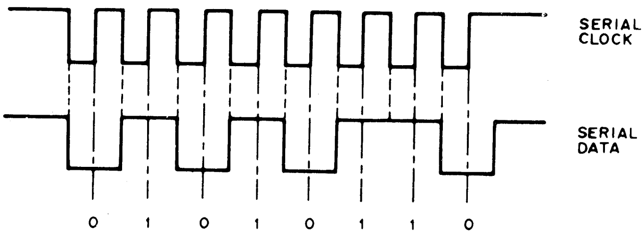


Fig. 5-1-3 Serial Data

The informations are converted into 8 bit logic data inside micro processor IC2. And for example, the coded data (Serial Data) is (0.1.0.1.0.1.1.0) and the timing chart between the serial data and the serial clock as shown in Fig. 5-1-3.

No.	DATA TRANSMISSION	
①	CAMERA → VTR	• MEMORY ON/OFF • REC/P.B SELECT • VTR P.B REMOTE CONTROL
②	TUNER → VTR	
③	WIRED REMOTE CONTROLLER → VTR	
④	INSIDE VTR	
⑤	VTR → CAMERA TUNER WIRED REMOCON	• BATTERY LEVEL • TAPE COUNTER
⑥	VTR → CAMERA	
⑦	VTR → CAMERA	

Fig. 5-1-4 Serial Data Transmission

The following serial data is supplied from the VTR to the camera during the transmission (5), (6) and (7) as;

. Battery level

. Tape counter display (Number, Memory : M)

The following serial data is supplied from the camera to the VTR during the transmission (1) as;

. Tape counter control (Reset, Memory ON/OFF)

. Remote control of playback (PLAY, SLOW, CUE, REVIEW, INS)

. REC/Playback selection signal

Details

The pin identifications and functions of the micro processor, IC2 is described in the Table 5-1.

IC2 MN1554 CVB

Pin Identifications

Pin No.	Name	IN/OUT	Descriptions	
1	P12	OUT	F-VTR Display (F-VTR = L) F-VTR = Portable VTR with CAMERA SELECT Switch	
2	P13	OUT	Tally Cancel Signal (F-VTR only)	
3	SYNC	OUT	Not Used	
4	SIRQ	IN	V.SYNC Input	
5	IRQ	IN	Serial Clock (Inverted) Input	
6	SBT	IN	Serial Clock Input	
7	SBO	OUT	Serial Data Output	
8	SBI	IN	Serial Data Input	
9	RST	IN	Reset Pulse Input	
10	P20	OUT	Key Scanning Pulse Output Data Output for DAO (20) of MN1237 (IC1)	
11	P21	OUT	Key Scanning Pulse Output Data Output for DA1 (22) of MN1237 (IC1)	
12	P22	OUT	Key Scanning Pulse Output Data Output for DA2 (23) of MN1237 (IC1)	
13	P23	OUT	Key Scanning Pulse Output Data Output for DA3 (25) of MN1237 (IC1)	
14	P30	OUT	Key Scanning Pulse Output Data Ouptut for DA4 (28) of MN1237 (IC1)	
15	P31	OUT	Key Scanning Pulse Output Data Output for DA5 (29) of MN1237 (IC1)	
16	P32	IN	Battery Warning-1 Input (CAMERA ITSELF)	
17	P33	IN	Battery Warning-2 Input (CAMERA ITSELF)	
18	P40	OUT	Automatic White Balance (B) 5 (LSB) INITIAL	(H)
19	P41	OUT	Automatic White Balance (B) 4	(H)
20	P42	OUT	Automatic White Balance (B) 3	(L)
21	P43	OUT	Automaitc White Balance (B) 2	(L)
22	P50	OUT	Automatic White Balance (B) 1	(L)
23	P51	OUT	Automatic White Balance (B) 0 (MSB)	(H)
24	P52	OUT	Playback DC Output (Playback = H)	
25	VDD	IN	+5V DC Power Input	
26	PC0	OUT	Battery Warning Output (Normal = L, NG = H, L, H, L)	
27	PC1	OUT	Title Color Correction Output (Blue, Red = H, else = L)	
28	P53	OUT	INT/EXT Title Select (INT = H, EXT = L)	
29	P60	IN	Key Scanning Pulse Input	
30	P61	IN	Key Scanning Pulse Input	
31	P62	IN	Key Scanning Pulse Input	
32	P63	IN	Key Scanning Pulse Input	
33	P70	IN	Key Scanning Pulse Input	
34	P71	IN	Key Scanning Pulse Input	
35	P72	IN	Key Scanning Pulse Input	
36	P73	IN	Key Scanning Pulse Input	
37	P80	IN	Serial Clock (Tally Detect) Input	
38	P81	IN	Camera Power ON/OFF Detect Input (ON = H, OFF = L)	
39	P82	IN	Timer Count Pulse (60 Hz = V.pulse) Input	
40	P83	IN	Standby Detect Input (ON = L, Standby = H)	
41	P90	OUT	REC Timing Pulse Output	
42	P91	OUT	FADE Timing Pulse Output	
43	P92	OUT	REC RESET Pulse Output	
44	P93	OUT	NEGA/POSI Select Output (NEGA =L, POSI = H)	
45	PA0	OUT	Automatic White Balance (R) 5 (LSB) INITIAL	(L)
46	PA1	OUT	Automatic White Balance (R) 4	(L)
47	PA2	OUT	Automatic White Balance (R) 3	(H)
48	PA3	OUT	Automatic White Balance (R) 2	(L)
49	PB0	OUT	Automatic White Balance (R) 1	(H)
50	PB1	OUT	Automatic Whtic Balance (R) 0 (MSB)	(L)
51	PB2	OUT	REC START/PAUSE Control Output (Start = L for PANASONIC)	
52	PB3	OUT	REC Display Output (REC = H, PAUSE = L)	
53	OSC	OUT	Clock Pulse Generator	
54	OSC	IN	Clock Pulse Generator or Clock Pulse Input	
55	TCI	IN	H. SYNC or 32.768 KHz Pulse Input (Power ON = H. SYNC)	
56	TC1	OUT	Timer Pulse Generator	
57	Vss	---	Ground	
58	P00	OUT	Timer Count Select Output (ON = L, STBY/Power OFF = H)	
59	P01	OUT	Title Mask pulse Output (Title 1,2 only)	
60	P02	OUT	V. SYNC Output	
61	P03	OUT	Power Control Output (Power OFF = H, ON = L)	
62	PC2	OUT	AWC Warning Output (OK = L, NG = Blink (0.4 sec), Setting = Blink (0.2 sec))	
63	P10	OUT	ADM Output for MN1237 (IC1)	
64	P11	OUT	LDI Output for MN1237 (IC1)	

Table 5-1 Pin Identification of IC2 (Microprocessor)

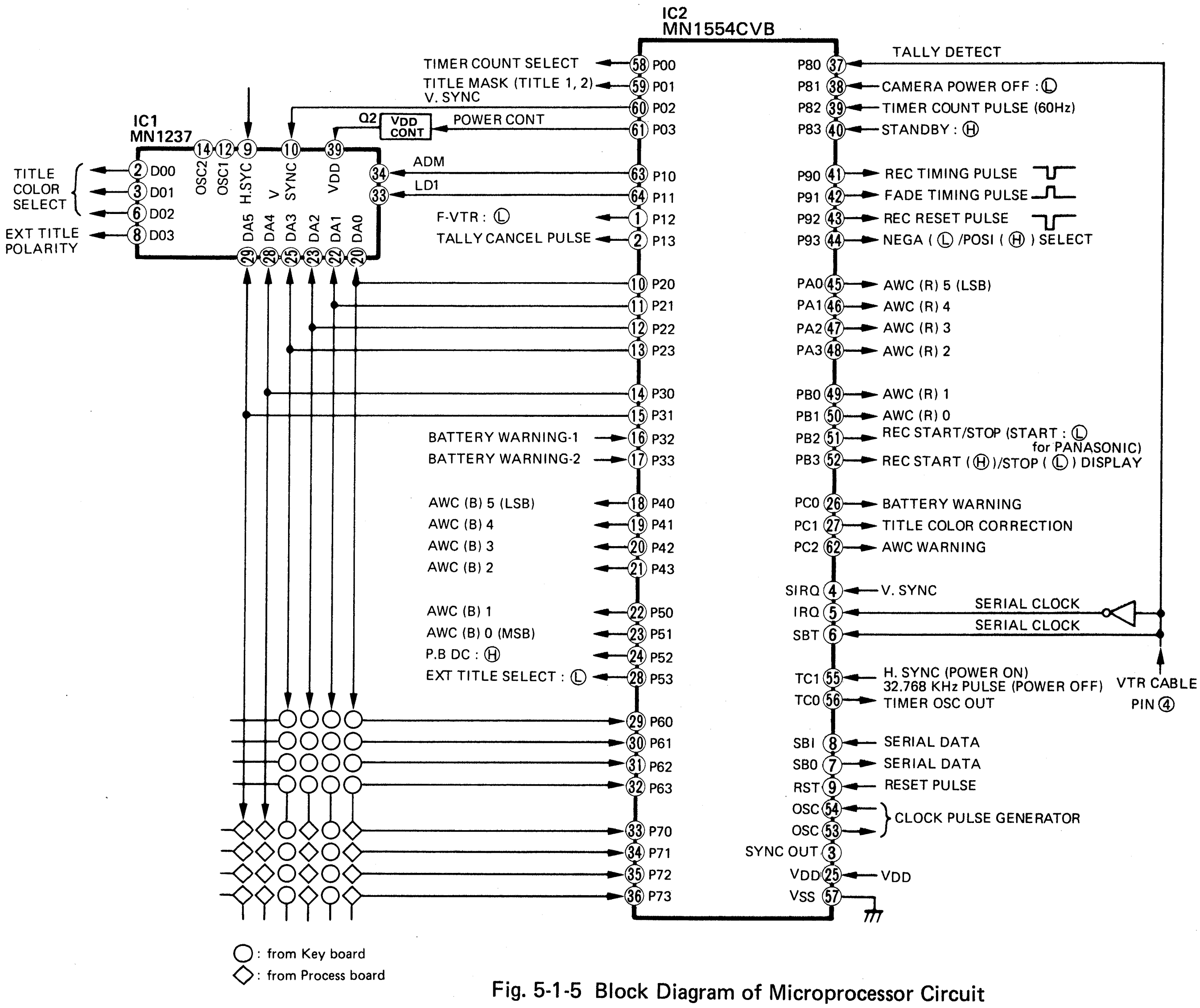

IC2
MN1554CVB
IC1
MN1237
TITLE COLOR SELECT
EXT TITLE POLARITY
D00
D01
D02
D03
OSC2
OSC1
H.SYC
V
SYNC
VDD
DA5
DA4
DA3
DA2
DA1
DA0
Q2
VDD CONT
POWER CONT
ADM
LD1
TIMER COUNT SELECT
TITLE MASK (TITLE 1, 2)
V. SYNC
F-VTR : Ⓛ
TALLY CANCEL PULSE
BATTERY WARNING-1
BATTERY WARNING-2
AWC (B) 5 (LSB)
AWC (B) 4
AWC (B) 3
AWC (B) 2
AWC (B) 1
AWC (B) 0 (MSB)
P.B DC : Ⓗ
EXT TITLE SELECT : Ⓛ
P00
P01
P02
P03
P10
P11
P12
P13
P20
P21
P22
P23
P30
P31
P32
P33
P40
P41
P42
P43
P50
P51
P52
P53
P60
P61
P62
P63
P70
P71
P72
P73
TALLY DETECT
P80
P81
P82
P83
CAMERA POWER OFF : Ⓛ
TIMER COUNT PULSE (60Hz)
STANDBY : Ⓗ
P90
P91
P92
P93
REC TIMING PULSE
FADE TIMING PULSE
REC RESET PULSE
NEGA (Ⓛ /POSI (Ⓗ) SELECT
PA0
PA1
PA2
PA3
AWC (R) 5 (LSB)
AWC (R) 4
AWC (R) 3
AWC (R) 2
PB0
PB1
PB2
PB3
AWC (R) 1
AWC (R) 0
REC START/STOP (START : Ⓛ for PANASONIC)
REC START (Ⓗ)/STOP (Ⓛ) DISPLAY
PC0
PC1
PC2
BATTERY WARNING
TITLE COLOR CORRECTION
AWC WARNING
SIRQ
IRQ
SBT
V. SYNC
SERIAL CLOCK
SERIAL CLOCK
TC1
TC0
H. SYNC (POWER ON)
32.768 KHz PULSE (POWER OFF)
TIMER OSC OUT
VTR CABLE PIN ④
SBI
SB0
RST
SERIAL DATA
SERIAL DATA
RESET PULSE
OSC
OSC
CLOCK PULSE GENERATOR
SYNC OUT
VDD
VSS
VDD
○ : from Key board
◇ : from Process board

Fig. 5-1-5 Block Diagram of Microprocessor Circuit

IC1 MN1237

Pin Identifications

Pin No.	Name	Description
1	VOB	Character Background Signal Output
2	DO0	Title Color Select-0 Out
3	DO1	Title Color Select-1 Out
6	DO2	Title Color Select-2 Out
8	DO3	Key Polarity Select Out
9	H. SYNC	H. SYNC Input
10	V. SYNC	V. SYNC Input
12	OSC 1	Clock Pulse Generator
14	OSC 2	
15	Vss	Ground
20	DA0	Data Input Bus-0
22	DA1	Data Input Bus-1
23	DA2	Data Input Bus-2
25	DA3	Data Input Bus-3
28	DA4	Data Input Bus-4
29	DA5	Data Input Bus-5
31	DA6	Data Input Bus-6
33	LDI	Strobe Pulse Input
34	ADM	Address Mode Select Input
35	TST	Test Input Concected to Ground
39	VDD	+5V Power Supply Input
41	VOW	Character Signal Output

Table 5-2 Pin Identification of IC1

IC2 Pin 16	IC2 Pin 17	DISPLAY
1	0	E – – – – F
1	1	E – – – F
0	1	E – – F
0	0	E – F

IC1 MN1237

TITLE COLOR SELECT

DOϕ	DO1	DO2	TITLE COLOR
0	0	0	WHT (White)
1	0	0	MGT (Magenta)
0	1	0	YLW (Yellow)
1	1	0	CYN (Cyan)
0	0	1	(CYN (Cyan))
1	0	1	BLU (Blue)
0	1	1	GRN (Green)
1	1	1	RED (Red)

DO3 (KEY POLARITY OUT (EXT NEGA))
NORMAL : H
REVERSE : L

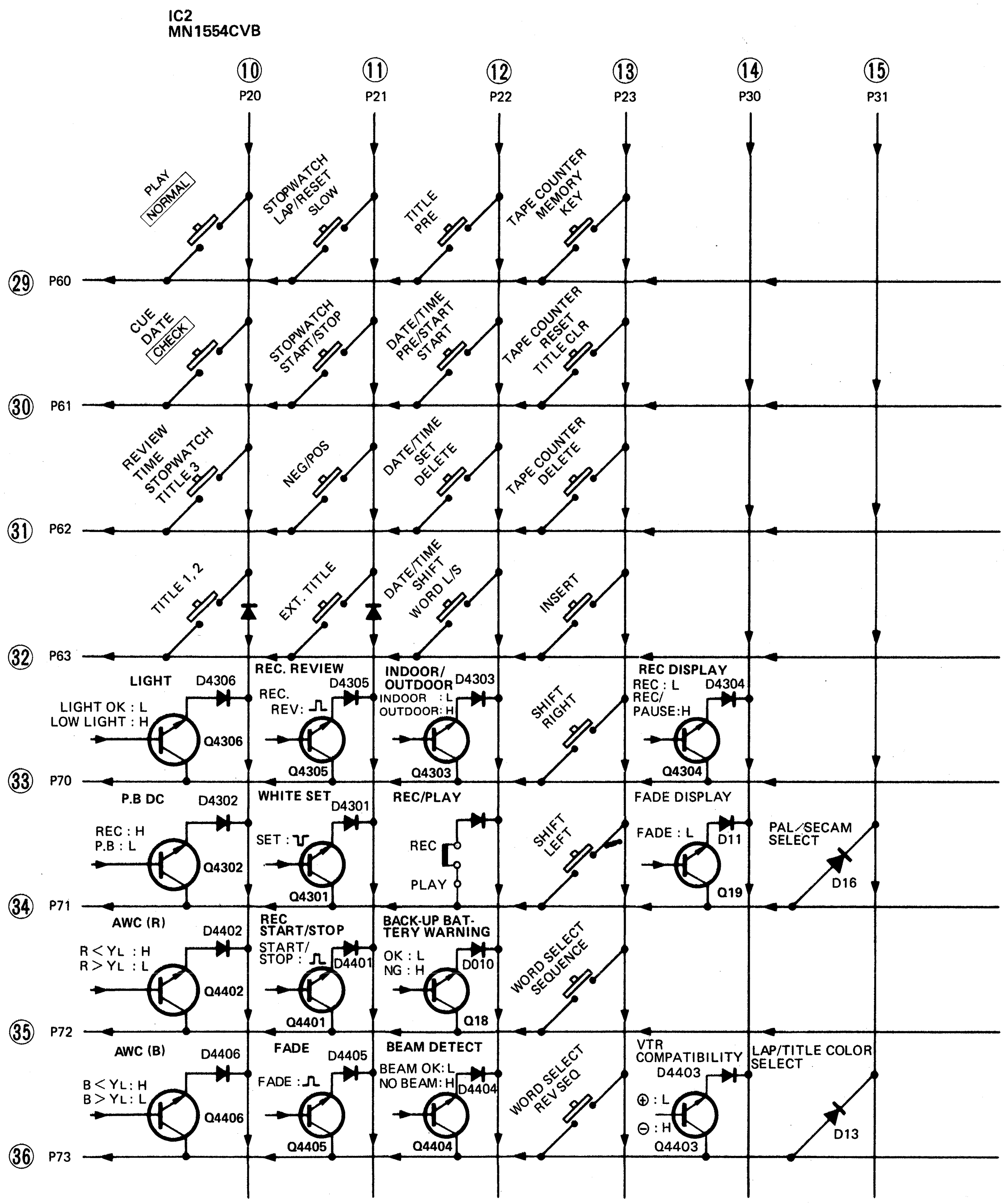

IC2
MN1554CVB
⑩ P20
⑪ P21
⑫ P22
⑬ P23
⑭ P30
⑮ P31
㉙ P60
㉚ P61
㉛ P62
㉜ P63
㉝ P70
㉞ P71
㉟ P72
㊱ P73
PLAY
NORMAL
STOPWATCH LAP/RESET
SLOW
TITLE PRE
TAPE COUNTER MEMORY KEY
CUE
DATE
CHECK
STOPWATCH START/STOP
DATE/TIME PRE/START START
TAPE COUNTER RESET TITLE CLR
REVIEW TIME
STOPWATCH TITLE 3
NEG/POS
DATE/TIME SET DELETE
TAPE COUNTER DELETE
TITLE 1, 2
EXT. TITLE
DATE/TIME SHIFT WORD L/S
INSERT
LIGHT
D4306
LIGHT OK : L
LOW LIGHT : H
Q4306
REC. REVIEW
D4305
REC. REV: ⎍
Q4305
INDOOR/ OUTDOOR
D4303
INDOOR : L
OUTDOOR: H
Q4303
SHIFT RIGHT
REC DISPLAY
REC : L
D4304
REC/ PAUSE:H
Q4304
P.B DC
D4302
REC : H
P.B : L
Q4302
WHITE SET
D4301
SET : ⊔
Q4301
REC/PLAY
REC
PLAY
SHIFT LEFT
FADE DISPLAY
FADE : L
D11
Q19
PAL⁄SECAM SELECT
D16
AWC (R)
D4402
R < YL : H
R > YL : L
Q4402
REC START/STOP
START/ STOP : ⎍
D4401
Q4401
BACK-UP BATTERY WARNING
OK : L
NG : H
D010
Q18
WORD SELECT SEQUENCE
AWC (B)
D4406
B < YL : H
B > YL : L
Q4406
FADE
D4405
FADE : ⎍
Q4405
BEAM DETECT
BEAM OK: L
NO BEAM: H
D4404
Q4404
WORD SELECT REV SEQ
VTR COMPATIBILITY
D4403
⊕ : L
⊖ : H
Q4403
LAP/TITLE COLOR SELECT
D13

Fig. 5-1-6 Input Matrix Circuit

The programmed signals (key scan pulse) are supplied from output ports P20, P21, P22, P23, P30 and P31 to input interface circuits.

Then, these programmed signals are supplied from input interface circuits to input port P60, P61, P62, P63, P70, P71, P72 and P73 switches and transistors. (Refer to 5-2, Input Interface)

According to the programmed signals at input port P60, P61, P62, P63, P70, P71, P72 and P73, and the signal at input port P32 and P33, the micro processor identifies the instruction with the signal flow route at input interface circuit and supplies the instructional signals (P20 - P23, P30 - P31) to character generator, IC1. The serial clock pulse is supplied from VTR to pin 5 (IRQ) and pin 6 (SBT) of IC2 to match the timing for data transmitting and receiving to/from VTR.

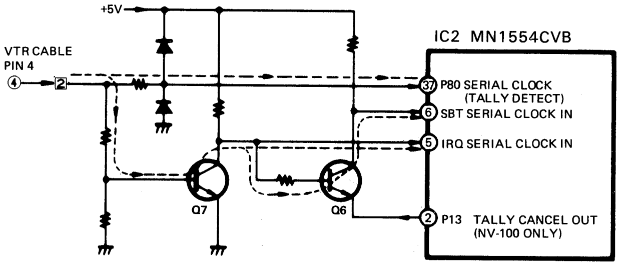

+5V
VTR CABLE PIN 4
④
2
IC2 MN1554CVB
37 P80 SERIAL CLOCK (TALLY DETECT)
6 SBT SERIAL CLOCK IN
5 IRQ SERIAL CLOCK IN
2 P13 TALLY CANCEL OUT (NV-100 ONLY)
Q7
Q6

Fig. 5-1-7 Serial Clock Circuit

The serial data is fed from VTR to pin 8 (SBI) of IC2 so that the micro processor identifies the instruction from VTR. Also the serial data is sent from pin 7 (SBO) of IC2 to VTR through serial data transmission controller Q40 and inverter Q8. (Fig.5-1-5)

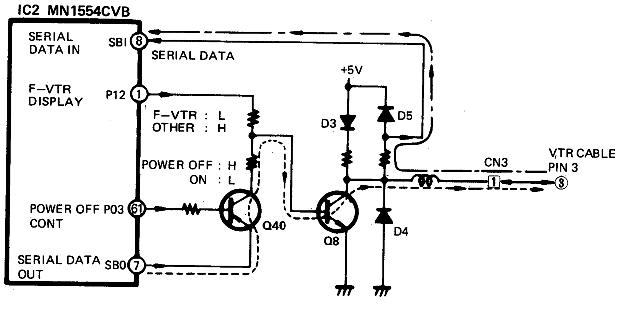

IC2 MN1554CVB
SERIAL DATA IN SBI 8
SERIAL DATA
F-VTR DISPLAY P12 1
F-VTR : L
OTHER : H
POWER OFF : H
ON : L
POWER OFF P03 61 CONT
SERIAL DATA OUT SBO 7
+5V
D3
D5
D4
Q40
Q8
CN3
1
VTR CABLE PIN 3
③

Fig. 5-1-8 Serial Data Circuit

The 50 Hz clock pulse (Timer Count Pulse) generated by the wide blanking (W.BL) pulse at process board for the stopwatch function is supplied to pin39 (P82) of IC2 the standby switch is placed ON position.

The V. sync pulse is fed from sync separation circuit on the Deflection board to pin 4 (SIRQ) of IC2 to control the vertical timing.

The character select circuit is shown in Fig. 5-1-9. When the either title-1 or title-2 characters are displayed on EVF screen, the character select circuit is functioned. Because the character select circuit in IC5 on Deflection board makes separation depend on the vertical location of character signals. Therefore, the upper half of either title-1 or title-2 character is only displayed in the EVF and lower half of that can be recorded and also displayed in the EVF.

The character select circuit is functioned so that the title-1 and 2 can be recorded to VTR.

The title mask signal is supplied from pin 59 (P01) to the both bases of Q1 and Q5 as shown in fig.

During the title mask pulse is high period, the character signal from pin 41 of IC1 is fed to IC5 on Deflection board through Q1.

During the title mask pulse is low period, the character signal is sent to IC8 on Process board through Q3 and Q4.

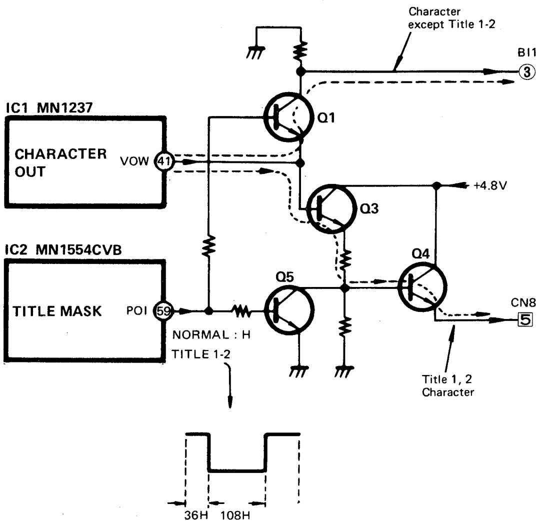

Character except Title 1-2
BI1
③
IC1 MN1237
CHARACTER OUT
VOW 41
Q1
Q3
+4.8V
IC2 MN1554CVB
TITLE MASK
POI 59
NORMAL : H
TITLE 1-2 : L
Q5
Q4
CN8
5
Title 1, 2 Character
36H
108H

Fig. 5-1-9 Character Select Circuit

The REC Reset (fade reset) signal is sent from pin 43 (P92) of IC2 to rec control circuit on Process board so that fader mode is reset when the camera is set to fade-in/out mode.

The REC Timing signal is fed from pin 41 (P90) of IC2 to rec control circuit on process board to protect the misoperation of the fade-in/out mode by the noise of electrostatics by controlling the fade-in/out timing. The FADE Timing signal is also supplied from pin 42 (P91) of IC2 to rec control circuit on process board for the same reason and purpose.

The NEGA/POSI control signal is applied from pin 44 (P93) of IC2 to video signal processing circuit on process board so that the normal(positive) picture is appeared when camera is aimed to negative color film.

Camera power detect circuit consisting of Q34 and Q9 detects whether the camera power is supplied or not and sends the information to pin 38 of IC2.

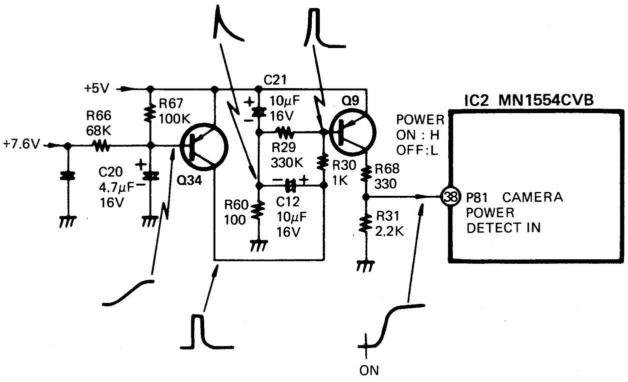


Fig. 5-1-10 Power Detect Circuit

Then, IC2 sends out the power control signal from pin 61 of IC2 both base of Q30 and Q2.

When the camera is operated normally, Q30 and Q2 are turned ON so that +5V DC is supplied to other circuit.

When the camera power is cut off, Q30 and Q2 are turned OFF so that +5V DC is not supplied to other circuit except IC2 in order for longer battery life.

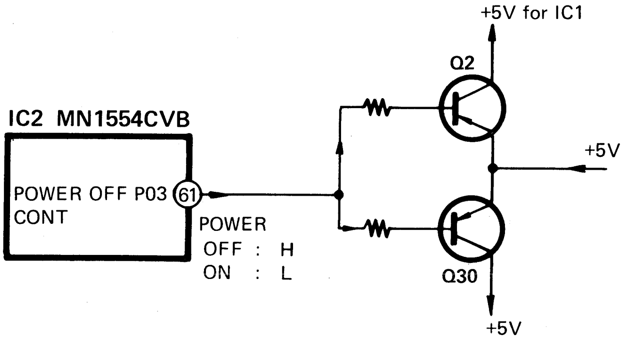


Fig. 5-1-11 Power Control Circuit

5-2 Input Interface Circuit

The input interface circuits consist of the two blocks as;

. EVF Display Board Circuit

. Camera Conditions Sensor Circuit

and these are constructed in the matrix circuit.

The output ports and input ports of the micro processor is incorporated with the matrix circuit.

The programmed signals (key scan pulses) are supplied from the output ports P20 - P23, P30 - P31 to the matrix circuit so that the programmed signals are returned to the input ports P60 - P63, P70 - P73 through diodes/switches, in the matrix circuit.

The micro processor, IC2 will know the function of the camera by detecting the returned programmed signal. According to the signals at the input ports of the micro processor, IC2, the micro processor supplies the graphics instructions to the character generator, IC1 and the remote control instructions to VTR.

5-3 Character Generator

The clock pulse frequency of IC1 is adjusted by VR1 (CHARACTER SIZE).

The display characters are separated into the three categories as;

(1) A : Cannot be recorded and only display on the EVF.

(2) B : Can be recorded and supplied to VTR recorder except title-1 & 2.

(3) C : Title-1 & 2 (can be recorded)

The character (A + B) at pin 41 (VOW) of IC1 is supplied through Q1 to pin 16 of IC5 on the deflection board.

The character (A + B) is separated into the graphics (A) and graphics (B) inside IC5 on the deflection board.

The graphics (B) is fed from pin 14 of IC5 on deflection board to process board and mixed with the video signal inside IC8 on the process board. Then PAL signal (video + C + B) is supplied from pin 13 of IC8 to VTR through pin 1 of CN101 VTR cable. Also PAL signal (EVF video + C + B) is supplied from pin 13 of IC8 through the trap (CF6) and pin 18 of IC5 on the deflection board.

The signal (EVF video + C + B) is mixed with the graphics (A) inside IC5 on the deflection board so that the signal (EVF video + C + B + A) is supplied from pin 24 of IC5 to viewfinder.

6. Audio/Lens Control Board (YFVPKA2005EA)

6-1. AIC amplifier

Outline

The AIC amplifier receives AIC detect signal from process board and drives lens iris in order to keep video output level constant.

Details

AIC amplifier consists of IC1(a) and IC1(b).

The AIC detect signal is supplied from signal processing circuit on process board to pin 6 (--) of IC1 and amplified by IC1(b). Then it is sent from pin 7 of IC1 to drive coil of lens iris in order to open/close lens iris. In addition to this, the beam detect signal from deflection board is fed to pin 6 of IC1 in order to close the lens iris during the beam current is insufficient.

The induced voltage (it is occurred by moving lens iris inside the damper coil.) is fed from lens damper coil to pin 3 (+) of IC1 and amplified by IC1(a). Then amplified signal is fed from pin 1 of IC1 to pin 6 of IC1 to damp the lens iris hunting.

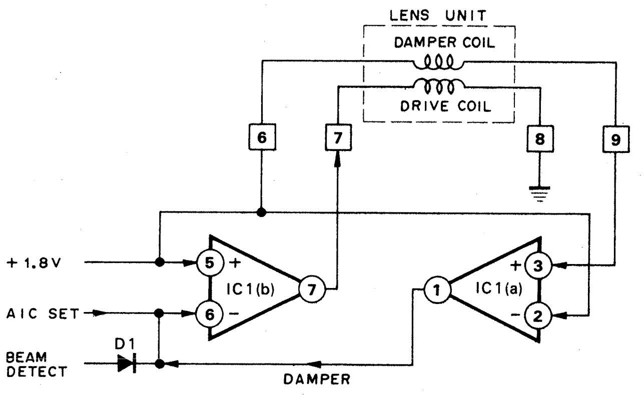

LENS UNIT
DAMPER COIL
DRIVE COIL
6
7
8
9
+1.8V
AIC SET
BEAM DETECT
D1
5
6
IC1(b)
7
1
IC1(a)
3
2
DAMPER

Fig. 6-1 AIC Amplifier Circuit

6-2. Zoom Control Circuit

Outline

This circuit drives zoom lens motor.

Details

When the TELE switch SW1 on the handle grip is depressed, the base of Q4 shorted to the ground and turn ON Q4 and Q1. Therefore, the current flows into the zoom motor through Q1 and Q4 for zoom-in (telephoto) operation.

When the WIDE switch SW2 is depressed, Q2 and Q3 turn ON. Therefore, the current flows into the zoom motor (in the reverse direction) through Q3 and Q2 for zoom-out (wide angle) operation.

SW2 on the FADE/AGC SWITCH board is a zoom speed switch to set the zoom speed by changing the DC voltage at the both bases of Q2 and Q4.

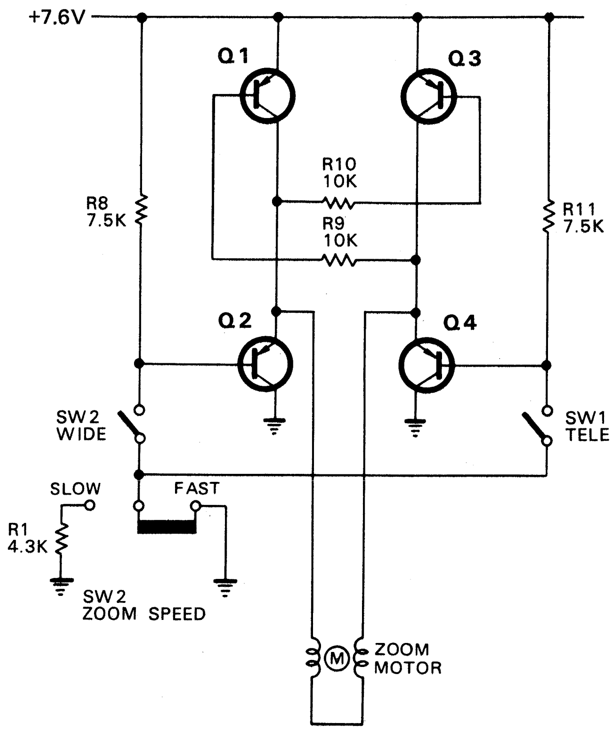

+7.6V
Q1
Q3
R10
10K
R9
10K
R8
7.5K
R11
7.5K
Q2
Q4
SW2
WIDE
SW1
TELE
SLOW
FAST
R1
4.3K
SW2
ZOOM SPEED
M
ZOOM
MOTOR

Fig. 6-2 Zoom Control Circuit

6-3 Audio Amplifier Circuit

Outline

This circuit amplifies the output from the mounted microphone or external microphones.

The amplified audio signal is sent out to the VTR for recording and to the earphone jack on the rear of the camera for audio monitoring.

Details

The -72dB output for channel-1 (left) or channel-2 (right) from the electret condenser microphone (which is mounted on the camera), or one/two external microphone(s) is/are supplied to audio amplifier consisting of Q6, Q7, IC2 and IC3 respectively where it/they is/are amplified +52dB.

The -20dB audio output at pins 1 (CH1) & 7 (CH2) of IC2 are sent directly to the portable VTR or via power supply to the table model VTR through terminal No. 3 (CH1) & 2 (CH2) of CN7 and terminal No. 7 (CH1) & 5 (CH2) of VTR connector CN101, and earphone jack JK1 through terminal No. 3 (CH1) & 2 (CH2) of CN8.

The amplified audio signal at pin 1 (CH1) & 7 (CH2) of IC3 are also fed to D4 (CH1) & D7 (CH2) where it is converted into DC voltages.

The rectified DC voltages are supplied to the base of Q6 (CH1) & Q7 (CH2) to control the resistance between the collector and emitter of Q6 & Q7.

When the audio signal level at pin 1 (CH1) & 7 (CH2) of IC3 increases, the DC voltage at the base of Q6 (CH1) & Q7 (CH2) also increases and resistance between collector and emitter decreases. Therefore, the audio signal level at pin 3 (CH1) & 5 (CH2) of IC3 decreases.

When the audio signal level at pin 1 (CH1) & 7 (CH2) of IC3 decreases, the reverse operation takes place.

In this way, the audio signal output level is kept constant.

The audio signal level is also controlled by the fade control signal supplied from Process board through Q5.

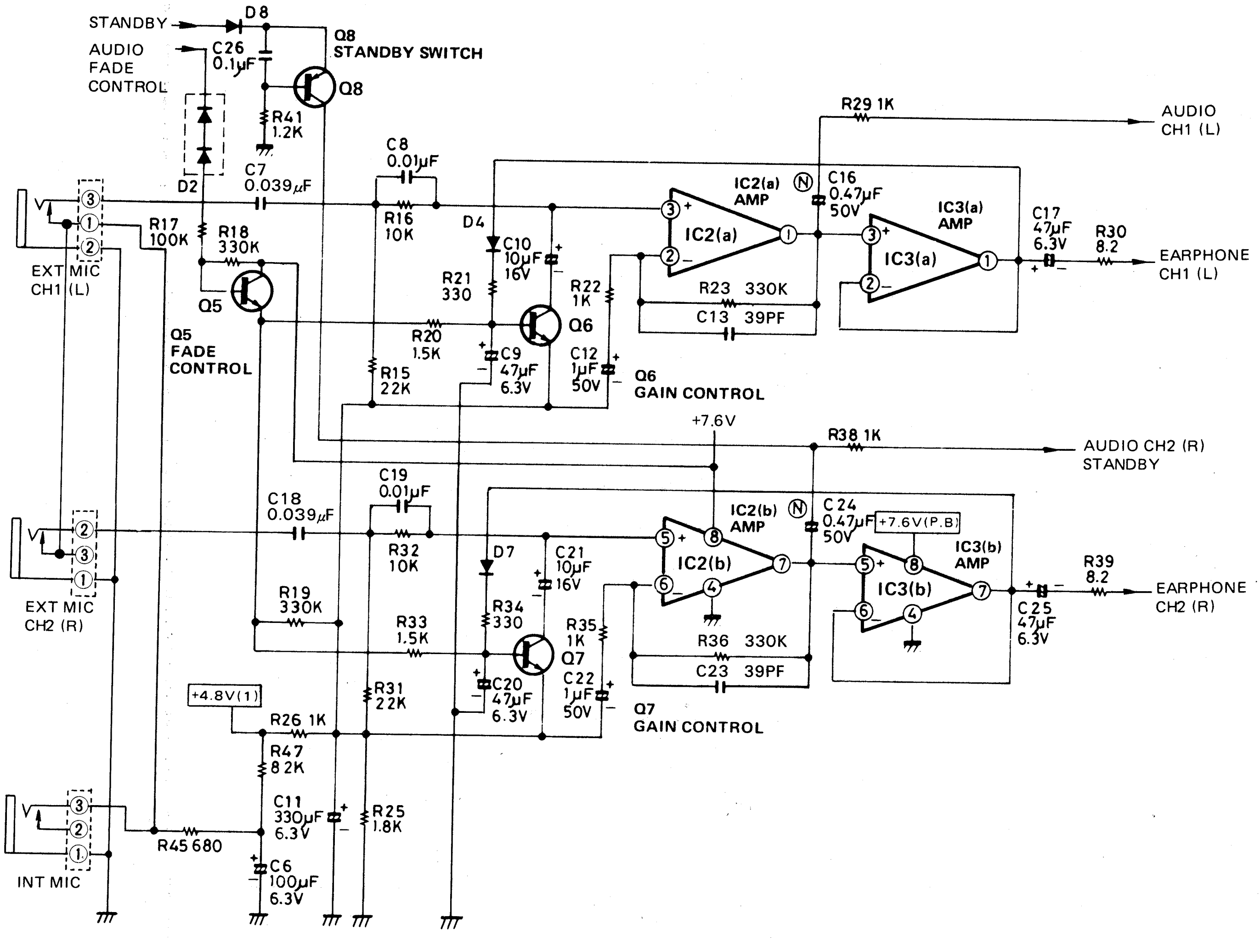

STANDBY
D8
AUDIO FADE CONTROL
C26 0.1μF
Q8 STANDBY SWITCH
Q8
R41 1.2K
D2
C7 0.039μF
R29 1K
AUDIO CH1 (L)
C8 0.01μF
R16 10K
D4
C10 10μF 16V
IC2(a) AMP
Ⓝ
C16 0.47μF 50V
IC3(a) AMP
IC2(a)
IC3(a)
C17 47μF 6.3V
R30 8.2
EARPHONE CH1 (L)
R17 100K
R18 330K
EXT MIC CH1 (L)
Q5
R21 330
R22 1K
R23 330K
C13 39PF
Q6
Q5 FADE CONTROL
R20 1.5K
C9 47μF 6.3V
C12 1μF 50V
R15 22K
Q6 GAIN CONTROL
+7.6V
R38 1K
AUDIO CH2 (R) STANDBY
C19 0.01μF
C18 0.039μF
IC2(b) AMP
Ⓝ
C24 0.47μF 50V
+7.6V(P.B)
IC3(b) AMP
R32 10K
D7
C21 10μF 16V
IC2(b)
IC3(b)
R39 8.2
EARPHONE CH2 (R)
EXT MIC CH2 (R)
R19 330K
R34 330
R33 1.5K
R35 1K
Q7
R36 330K
C23 39PF
C25 47μF 6.3V
C20 47μF 6.3V
C22 1μF 50V
Q7 GAIN CONTROL
+4.8V(1)
R31 22K
R26 1K
R47 8.2K
C11 330μF 6.3V
R25 1.8K
R45 680
C6 100μF 6.3V
INT MIC

Fig. 6-3 Audio Amplifier Circuit

7 Auto Focus Board (YFES950-43A), (YFES950-43B), (YFES950-43C)

7-1. General 56
7-2. Ultrasonic Transmission Circuit 57
7-3. Ultrasonic Echo-Reception Circuit 58
  7-3-1. Echo-Reception Circuit 58
  7-3-2. Variable Reference Voltage Circuit . . . 59
7-4. Motor Driving Circuit 60
  7-4-1. Data Process in IC001 for Motor Driving Circuit 60
  7-4-2. Lens Position Sensor 60
  7-4-3. Motor Driving Circuit 61
7-5. Supporting Circuit 62
  7-5-1. Regulators/Power Supply 62
  7-5-2. Thermal Correction Circuit 62
  7-5-3. Interface Circuit 62

7-1 General

This Auto Focus system is utilizing a ultrasonic to measure the time between the objects and camera and controls the lens focus automatically.

The time represents the distance between the camera/lens and object.

All functions of this Auto Focus system are controlled by the MPU (Micro Processor Unit).

The system primary consists of the four blocks as;

(1) Ultrasonic Transmission Circuit
(2) Ultrasonic Echo-Reception Circuit
(3) Lens Motor Driving Circuit
(4) Supporting Circuits

The functional block diagram of the Auto Focus system is shown in Fig. 7-1-1.

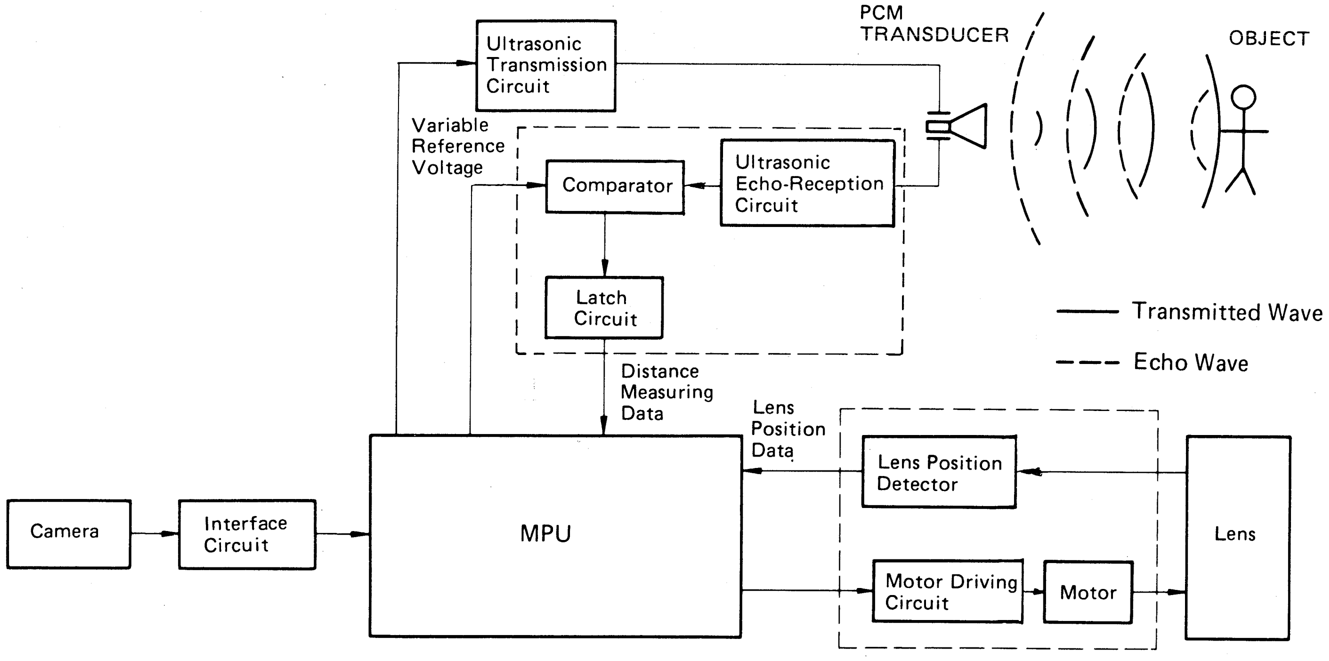
The transmission circuit transmits the 63.8KHz pulsed ultrasonic from the PCM (Piezo Ceramic Material) transducer when the timing pulse is provided from IC001.

The ultrasonic echo-reception circuit receives the echo from the objects at the transducer and amplifies the echo signal for the comparison with the variable reference voltage.

The echo level at the transducer is almost in inverse proportion to the distance/time so that the echo level from the near object is stronger and for the far object is weaker if the ultrasonic echo level is compared with the specified reference voltage.

This means that the sensitivity for the near object is overleveled and for the far object is not enough for the echo-reception circuit.

This Auto Focus system is primary designed to response human being so that the echo level from human being is varied according to the distance and is set to be higher than the reference voltage which is varied per echo distance/time to the object as shown in Fig. 7-1-2.



Ultrasonic Transmission Circuit
PCM TRANSDUCER
OBJECT
Variable Reference Voltage
Comparator
Ultrasonic Echo-Reception Circuit
Latch Circuit
Transmitted Wave
Echo Wave
Distance Measuring Data
Lens Position Data
Lens Position Detector
Camera
Interface Circuit
MPU
Lens
Motor Driving Circuit
Motor

Fig. 7-1-1 Functional Block Diagram of Auto Focus System

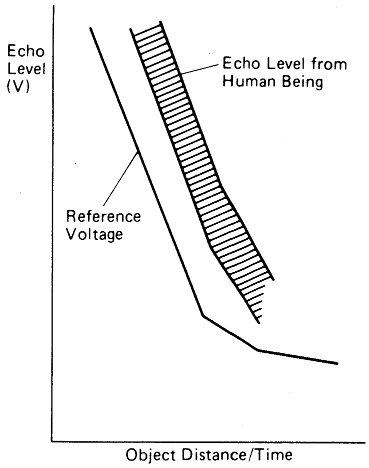


Fig. 7-1-2 Echo Level and Reference Voltage

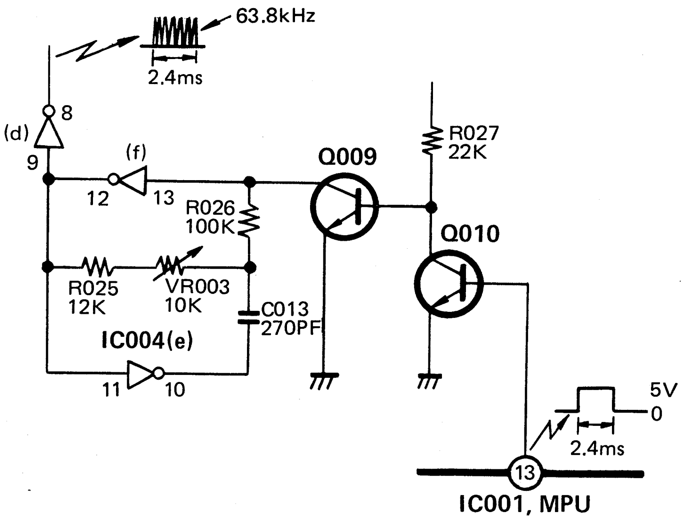


Fig. 7-2-1 Ultrasonic Generator

The echo level and the variable reference voltage is compared by the comparator.

The output of the comparator is supplied to IC001 after the output is holding by the latch circuit.

IC001 measures the time which the ultrasonic is transmitted and received from/on the transducer, and calculates the distance between the camera and the object based on the wave speed of the ultrasonic.

IC001 detects the lens focus position and instructs the motor driving circuit to activate the motor for turning focus ring to the desired position.

7-2 Ultrasonic Transmission Circuit

Outline

This circuit generates the ultrasonic and transmits the ultrasonic from the transducer.

Details

The clock pulse for IC001 is generated by 400KHz ceramic oscillator circuit consisting of X002, R034, C016 and C017.

Vs pulse is supplied from the camera unit through pin 10 of lens connector CN107 and Q23 to pin 25 of IC001. The 540 μs timing pulse is then generated at pin 11 of IC001 during the vertical blanking period.

The 2.4 ms pulse at pin 13 of IC001 is supplied to IC004(e) and IC004(f) thrugh Q009 and Q010 and the ultrasonic is generated during the 2.4 ms pulse period by the 63.8KHz oscillator circuit consisting of IC004(d), IC004(e) and IC004(f) as shown in Fig. 7-2-1.

The frequency of generated ultrasonic is adjusted by VR003 (63.8KHz ADJ) to 63.8KHz.

The ultrasonic Transmission circuit is shown in Fig. 7-2-2.

To reduce the pulsed audio noise from generating the ultrasonic, the trapezoid pulsed ultrasonic is transmitted. The 540 μs timing pulse at pin 11 of IC001 is supplied to the base of Q011.

The pulse at the collector of Q011 is integrated by R006 and C006 to make trapezoid at the collector of Q001. The trapezoid pulse is rounded its corner by R008 and C007 and amplified by Q002 and Q003.

The pulsed ultrasonic at pin 8 of IC004 is provided to Q004 through buffer Q005. Q004 is switching ON and OFF by the pulsed ultrasonic and the pulsed ultrasonic is built up during trapezoid period at the primary of T001.

The amplitude of the trapezoid pulsed ultrasonic at the secondary of T001 is approx. 100Vp-p which is transmitted from the PCM transducer through D001 and D002.

D001 and D002 cut the level less than ±0.7V so that the induced noise of T001 is cut for improving the noise figure of the echo reception circuit during receiving period.

When the trapezoid pulsed ultrasonic is transmitted, the current approx. 1 - 2 amperes is passed through T001 and creates the noises which are not observed, because the trapezoid pulsed ultrasonic is transmitted during the vertical blanking period.

To prevent the effects on the other circuits, the separate regulated power supplies are used.

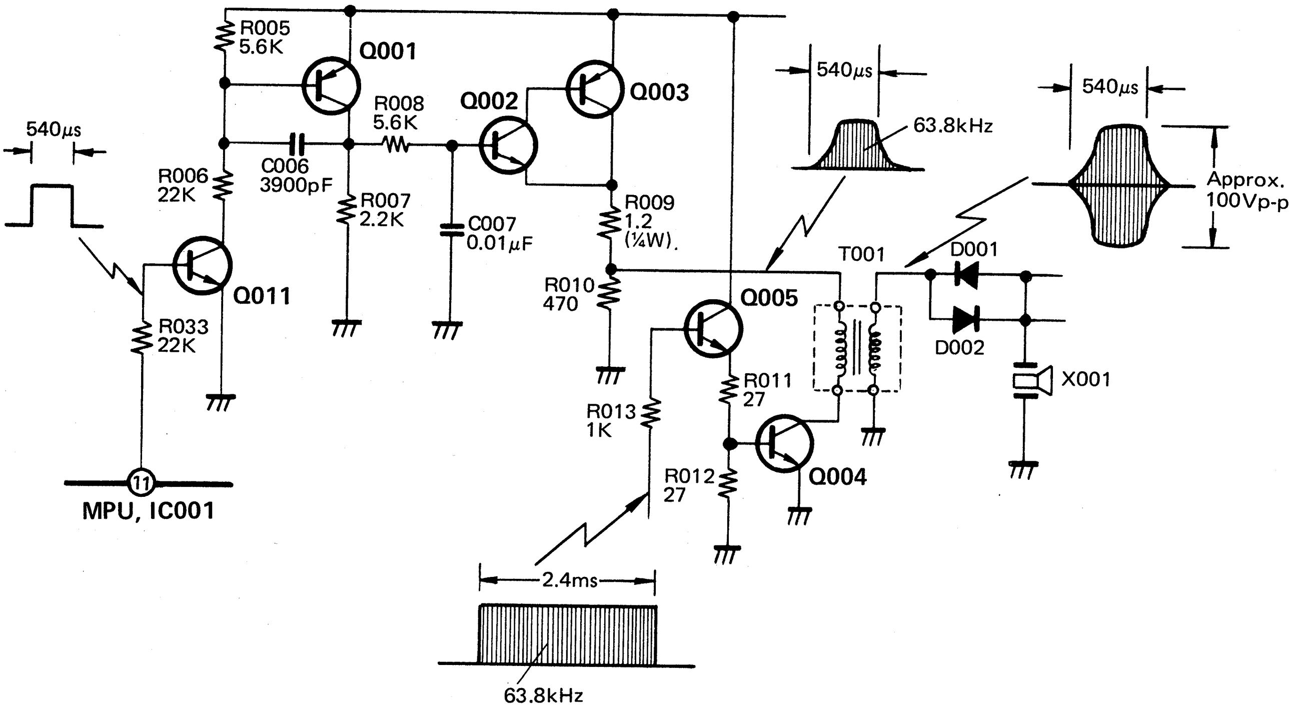

540μs
R005
5.6K
Q001
R008
5.6K
Q002
Q003
540μs
63.8kHz
540μs
Approx.
100Vp-p
R006
22K
C006
3900pF
R007
2.2K
C007
0.01μF
R009
1.2
(¼W).
T001
D001
R010
470
Q005
D002
X001
Q011
R033
22K
R011
27
R013
1K
R012
27
Q004
11
MPU, IC001
2.4ms
63.8kHz

Fig. 7-2-2 Ultrasonic Transmission

7-3 Ultrasonic Echo-Reception Circuit

Outline

This circuit receives the echo at transducer and it is sent to IC001 after comparing with the reference voltage and IC001 calculates the time/distance between the lens/camera and the object.

Details

7-3-1 Echo-Reception Circuit

The echo is received at transducer after several msec from the transmission and the echo level is in inverse proportion to the distance from the lens/camera and the object.

Due to the very low echo level at the transducer, the gain of the echo-reception circuit is approx. 100dB and the echo-reception circuit is shown in Fig. 7-3-1.

R001 and C001 are for matching impedance with T001.

D003 and D004 cut off the level more than ±0.7V for preventing excessive input at the pin 2 of operational amplifier IC002 during transmission period.

The echo at the transducer is supplied to pin 2 of IC002 and is amplified by IC002 and Q006. The amplifier gain of the echo-reception circuit is adjusted by VR001 (GAIN).

L002 is the resonance 63.8KHz band pass filter for improving the signal to noise ratios at 63.8KHz.

The comparator, the reference voltage and the latch circuit are shown in Fig. 7-3-2.

D008, 5V zener prevents the excessive input to be supplied to comparator IC003.

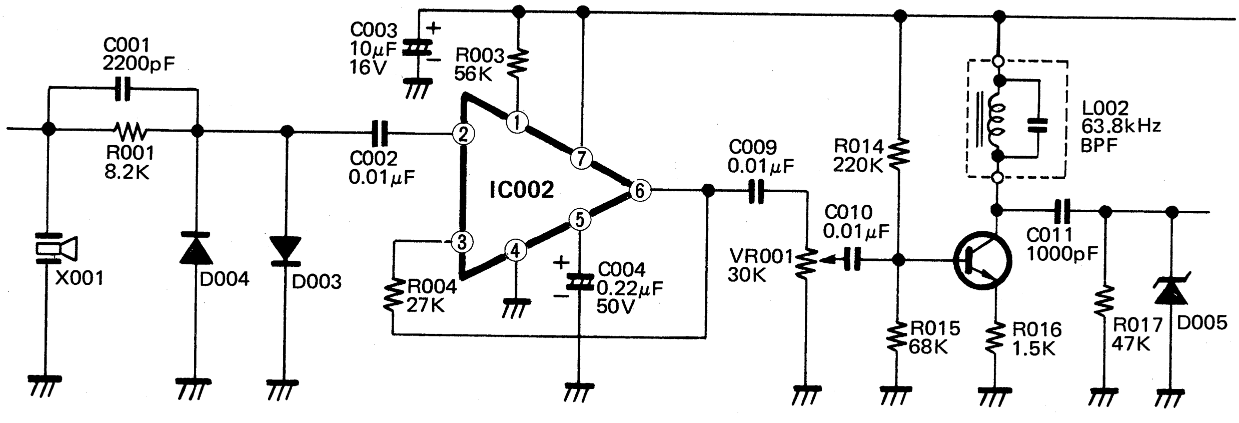

C001
2200pF
R001
8.2K
X001
D004
D003
C003
10μF
16V
+
R003
56K
C002
0.01μF
1
2
3
4
5
6
7
IC002
R004
27K
+
C004
0.22μF
50V
C009
0.01μF
VR001
30K
C010
0.01μF
R014
220K
R015
68K
L002
63.8kHz
BPF
C011
1000pF
R016
1.5K
R017
47K
D005

Fig. 7-3-1 Ultrasonic Echo Reception Circuit

The output is provided at pin 7 of IC003 when the echo level at pin 5 of IC003 becomes higher than the variable reference voltage at pin 6.

The received echo is supplied to pin 3 of IC003(a) and the variable reference voltage is supplied to pin 2 of IC003(a). The compared information is detected to pin 1 of IC003(a).

The compared information is holded by latch circuit consisting of IC004(b) and IC004(c).

The hold level of the latch is supplied to pin 21 of IC001.

IC001 calculates the time period/distance between the starting time of 540 μs transmitting timing pulse and the starting time of the holding echo at the anode of D008. This time period represents the distance of the object from the lens/camera.

7-3-2 Variable Reference Voltage Circuit

Q008 is ON during the 2.4 ms pulse width at the base of Q008, and also Q007 is ON. The variable reference voltage is determined by the time constant consisting of R21, R22, TH001, C012 and VR002 and is adjusted by VR002.

The variable reference voltage is designed to set the approx. 10dB lower than the human being echo signal for the optimum emission angle and effective distance (see Fig. 7-1-2 in page 62).

The timing chart for the transmission and the echo-reception is shown in Fig. 7-3-3.

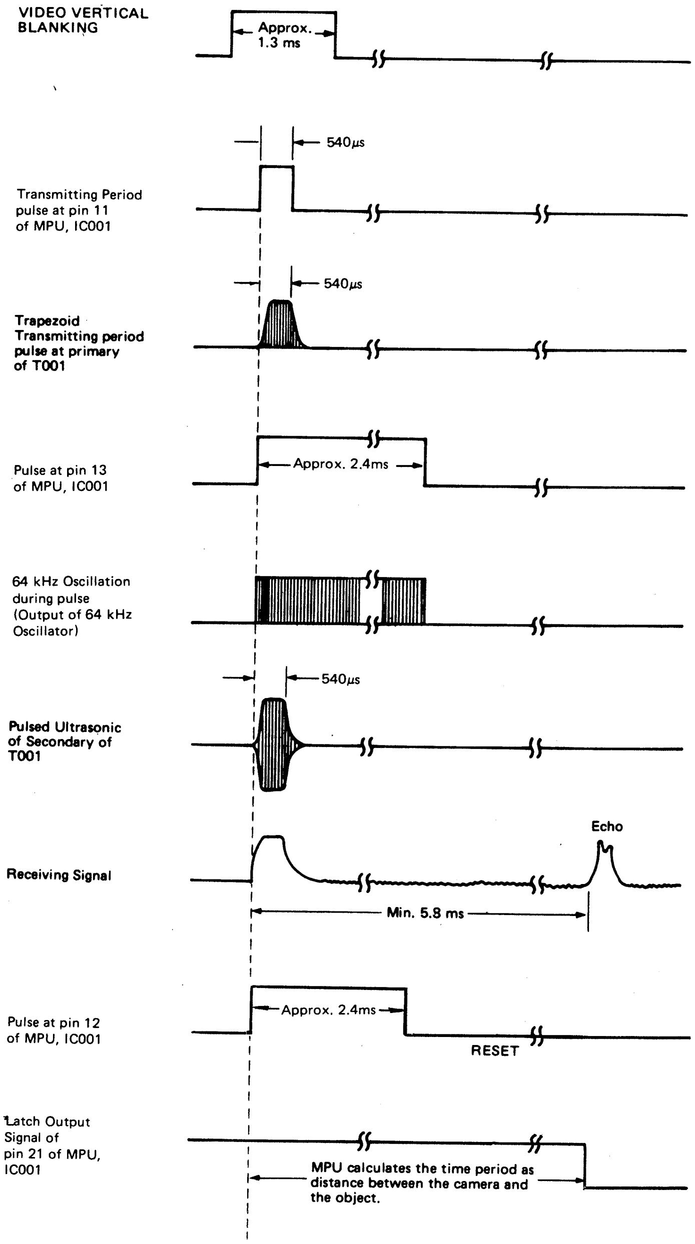


Fig. 7-3-3 Timing chart for Measuring Time/Distance

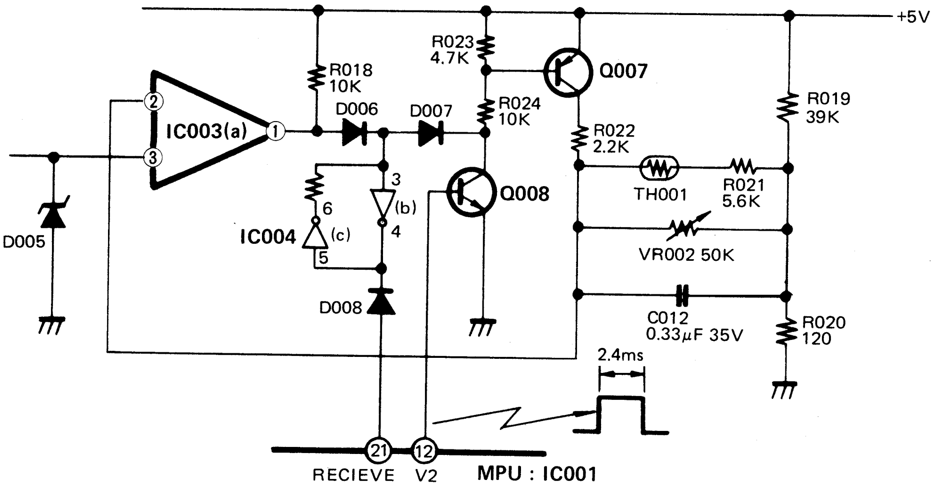

+5V
R023 4.7K
Q007
R018 10K
R024 10K
R019 39K
IC003(a)
2
3
1
D006
D007
R022 2.2K
TH001
R021 5.6K
3
6
(b)
4
IC004
(c)
5
Q008
VR002 50K
D005
D008
C012 0.33μF 35V
R020 120
2.4ms
21
12
RECIEVE
V2
MPU : IC001

Fig. 7-3-2 Comparator Reference Voltage and Latch Circuits

7-4 Motor Driving Circuit

Outline

This circuit detects the position of the lens motor/current lens position of the focus ring and provides the informations to IC001.
IC001 processes the informations of the echo signals and the lens positions, and activates the lens motor driving circuit to rotate the focus ring for the desired position.

Details

7-4-1 Data Process in IC001 for Motor Driving Circuit

Considering the external disturbances such as a metallic noise, telephone bell and clock bell etc, or the camera operations under bad conditions, the auto focus might be misoperationed whenever the auto focus is responded for each echo signal.
To avoid the misoperation, IC001 has the 7 registers for storing 7 distance-data.
When the 8th data is input into IC001, the 1st stored register data is shifted off.
IC001 always stores 7 data in the 7 registers as shown in Fig. 7-4-1.
IC001 checks the 7 data and neglects the data which is excessively different from other levels.
The similar data is shown with the asterisk mark in Fig. 7-4-1, for example.
IC001 makes the average of four data, 15, 14, 15 and 16 in the 1st status as 15 and activates the focus motor to be 15 lens point.
When the new echo/data is input as 12 lens point, IC001 makes the average of four data, 12, 15, 14 and 15 in the 2nd status as 14 lens point and activates the focus motor to be 14 lens point.

In this way, the misoperation is avoided and the auto focusing is not responded when the external disturbances occur or something is rapidly crossed in front of the camera/lens.
When the camera is aimed at the fixed object, the 7 distance data may be same. When more than 3 data of 7 are the same, the transmission interval becomes 0.3 sec by force to save the power consumptions.

7-4-2 Lens Position Sensor

This sensor detects the current position of the lens focus ring which has the gray codes pattern with 7 brush contacts around the focus ring.
The part of the gray codes pattern is shown in Fig. 7-4-2.

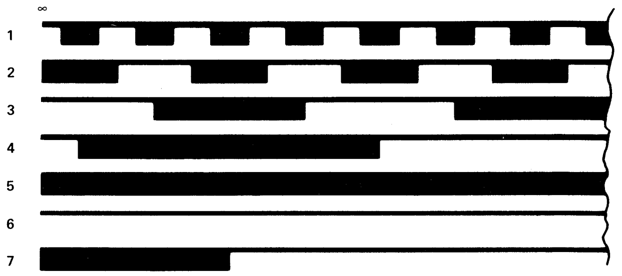


Fig. 7-4-2 Gray Codes Pattern for Lens Position Detector

The effective focus range is divided into 73 lens points and the gray codes for this 73 lens points are shown in Fig. 7-4-3.

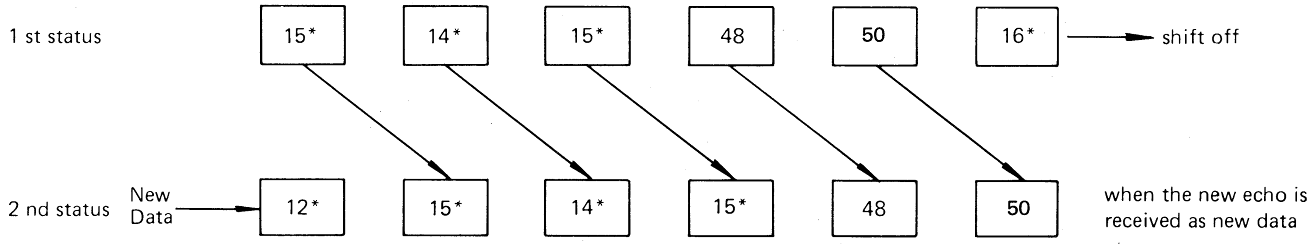


Fig. 7-4-1 7 Register/Data in MPU

	∞									10.0 m										5.0 m													3.0 m				
	73	**72**	**71**	**70**	**69**	**68**	**67**	**66**	**65**	**64**	**63**	**62**	**61**	**60**	**59**	**58**	**57**	**56**	**55**	**54**	**53**	**52**	**51**	**50**	**49**	**48**	**47**	**46**	**45**	**44**	**43**	**42**	**41**	**40**	**39**	**38**	**37**
1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1
2	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1
3	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1
6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
7	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

		2.5 m										2.0 m							1.8 m										1.5 m								1.3 m
	36	**35**	**34**	**33**	**32**	**31**	**30**	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0
2	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0
3	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Fig. 7-4-3 Output Informations of Encoder for Position of Lens Focus Ring
(Gray Codes) : 1 : High (Open Contact)
0 : Low (Close Contact)

The numbers 1-6 of the first column in Fig. 7-4-3 is corresponded with the numbers of the connector for the focus ring position sensor in the schematic diagram. In order to eliminate the ambiguity of the number, the gray codes change only one bit when the number moves one to the next.
When the brush contact is open, the level of the contact position is HIGH (+5V) and the bit is 1 .
When the brush contact is close, the level of the contact position is LOW (0V) and the bit is 0 .
C013 is used for noise protection.
The binary codes for focus ring position/lens position is provided at pin 2 - 8 of IC001 from focus ring position sensor, then IC001 has the information of the focus ring position so that IC001 detects the lens focus position.

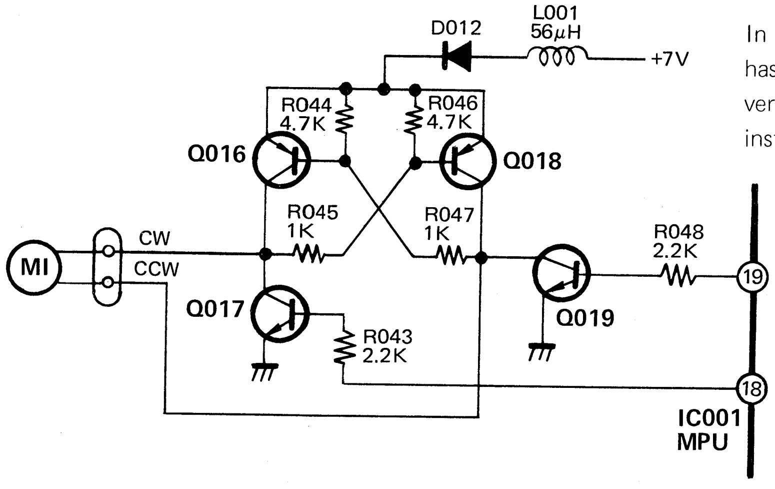


Fig. 7-4-4 Motor Driving Circuit

7-4-3 Motor Driving Circuit

Auto Focus Mode

. For clockwise rotation (FAR) :
The +5V DC is supplied from pin 19 of IC001 to the base of Q019 so that Q019 and Q016 are ON for rotating focus motor, until the focus ring becomes desired position.

. For counterclockwise rotation (NEAR) :
The +5V DC is supplied from pin 18 of IC001 to the base of Q017 so that Q017 and Q018 are ON for rotating focus motor, until the focus ring becomes desired position.

Power Focus Mode (using Camera Remote Control unit)

In order to rotate the focus ring slowly, the pulse (which has high level in 1 vertical period and low level in 2 vertical period) is supplied from pin 18 or 19 of IC001 instead of the +5V DC.

7-5 Supporting Circuit

Outline

This circuit consists of the three regulators for the power supply, thermal correction, interface and reset at the power ON and supports the stable operation of the system.

Details

7-5-1 Regulator/Power Supply

+5V DC Regulator

There is a +5V DC regulator IC007.
IC007 is the power supply for IC001, interface and reset circuits, and is always functioned even the camera is in the standby mode.

7-5-2 Thermal Correction Circuit

The speed of the ultrasonic wave in the air is effected by the temperature.
When the temperature is changed from 0°C to 40°C, the speed of the ultrasonic wave in the air is varied approx. 7%. Therefore the correction circuit is needed for the accurate measurements of the time/distance.

The standard pulse is charged from pin 16 of IC001 to C014. At the same time, the pulse generates from pin 10 of IC001, but the charging time of C014 changes by TH002. At this time, the difference of detail is detected by IC003(b) and supplied to pin 9 of IC001.

7-5-3 Interface Circuit

This circuit is interfaced for the informations between the camera and IC001.
The +7.6V DC is supplied to the reset circuit when the camera is Power ON condition.
Then Q020 is momently ON and Q021 is OFF.
Therefore the voltage is supplied to pin 26 of IC001 and IC001 is reset.
The informations at 12 pins connector of AF connector CN107 are as;

Camera Operation without Camera Remote Control Unit

The informations at 5 pins connector are as;

(a) Pin 1
This signal is sent from automatic iris control circuit on micro processor board to drive coil of lens iris motor in order to open/close lens iris.

(b) Pin 2
Ground

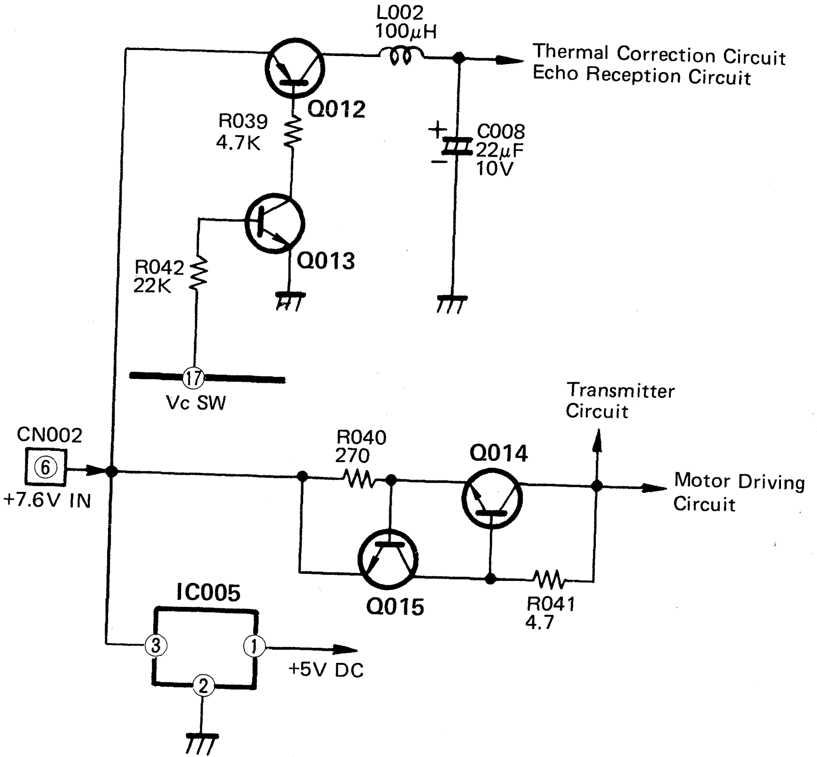

L002
100μH
Thermal Correction Circuit
Echo Reception Circuit
Q012
R039
4.7K
C008
22μF
10V
Q013
R042
22K
⑰
Vc SW
Transmitter Circuit
CN002
⑥
+7.6V IN
R040
270
Q014
Motor Driving Circuit
Q015
R041
4.7
IC005
③
①
②
+5V DC

Fig. 7-5-1 Regurator/Power Supply

(c) Pin 3
This signal is occurred by moving lens iris inside the damper coil. This induced voltage is fed to automatic iris control circuit on micro processor board.

(d) Pin 4
+1.8V DC

(e) Pin 5
When the camera is power on , the +7.6V is supplied to auto focus lens board. In case of playback, the +7.6V isn t supplied to there.

(f) Pin 6
Not used

(g) Pin 7
This signal is sent from zoom control circuit on deflection board. When the TELE switch SW102 on the handle grip is depressed, the camera lens does zoom-in (telephoto) operation.

(h) Pin 8
This signal is sent from zoom control circuit on deflection board. When the WIDE switch SW103 is depressed, the camera lens does zoom-out (wide angle) operation.

(i) Pin 9
Ground

(j) Pin 10

. Camera Operation without Camera Remote Control Unit

The positive polarity Vs at pin 10 of CN107 is supplied to the base of Q023 through C023 so that Q023 is ON for detecting Vs pulse at pin 25 of IC001. Pin 20 of IC001 supplies the signal as;

. HIGH : Without Camera Remote Control Unit
. LOW : With Camera Remote Control Unit

Pin 20 of IC001 supplies HIGH signal to the base of Q025 through R063 for effecting the switches, SW001 and SW002.
Q024 is not functioned for only Vs signal.
When the switch SW001 (AUTO FOCUS ON/OFF) is open, the Auto Focus mode is OFF position and Q025 is ON by applying the HIGH at the base of Q025 so that pin 24 of IC001 becomes LOW for the manual focusing or remote focusing.
When SW001 is close, the Auto Focus mode is ON position and the base of Q025 becomes LOW and Q025 is OFF so that pin 24 of IC001 becomes HIGH for the automatic focusing. When SW001 is open and the SW002 (AUTO/MAN) is kept pressing, the base of Q025 also becomes LOW so that pin 24 of IC001 becomes HIGH for the automatic focusing.

When Vs is not supplied, IC001 detects that the camera is in the standby mode and supplies HIGH at pin 17 of IC001 to shut off transmission, echo-reception, thermal correction and motor driving circuit are not functioned.

Camera Operation with Camera Remote Control Unit

When the Camera Remote Control Unit is connected, the HIGH is supplied to the base of Q022 from pin 11 of CN107 and Q022 is ON so that pin 23 of IC001 becomes LOW to identify for the connection of the camera remote control unit.
IC001 supplies the LOW to the base of Q025 through R063 so that the switches SW001 and SW002 and Q025 are not functioned.

(1) Vs + 0V DC for Auto Focus Mode :
When 0V DC is supplied from pin 10 of CN107 to the base of Q024 through R060 so that Q024 becomes OFF. And also Vs is supplied to the base of Q023 through C023 so that Q023 is ON while the Vs is applied.
The level at pin 24 of IC001 is HIGH for the automatic focusing.

(2) Vs + 2V DC (±1V) for Manual Focus Mode :
When 2V DC ±1V is supplied from pin 10 of CN107 to the base of Q024 and then Q024 is ON so that the level at pin 24 of IC001 becomes LOW for the manual focusing or power focusing.

(3) No Vs for Standby Mode :
When Vs is not supplied from pin 10 of CN107, IC001 detects no Vs at pin 25 of IC001 so that IC001 supplies the HIGH at pin 17 of IC001 to shut off the +9V DC regulator.

(k) Pin 11
When the camera remote control unit is not connected, pin 11 of CN107 is open and the base voltage of Q022 becomes LOW. Then Q022 is OFF so that pin 23 of IC001 becomes HIGH to identify for no remote control unit.
When the camera remote control unit is connected, the following informations per each status is supplied at the base of Q022 to identify the status of the camera remote control unit as;

(1) HIGH for STOP mode
(2) Positive Polarity Vs for FAR mode
(3) Negative Polarity Vs for NEAR mode

(l) Pin 12
Not used

8 Electronic Viewfinder Board (YFVPKA0706JB)

8-1 Video Amplifier Circuit

Outline

This circuit amplifies the video signal supplied from the Deflection board and fed it to the cathode ray tube (CRT).

Details

The video signal mixed with level indicator signal and character signal from the Deflection board is supplied to amplifier Q2 through pin No. 6 of EVF connector CN102, terminal No. 8 of CN1 and VR3 (CONTRAST). The amplified video signal at the collector of Q2 is then supplied to grid-1(G1) of the CRT through terminal No. 6 of BI1 and CRT socket CN104 together with DC voltage set by VR2 (BRIGHTNESS).

8-2 Horizontal Deflection Circuit

Outline

This circuit generates the horizontal(H) deflection sawtooth current for H.scanning beam inside the cathode ray tube (CRT).

Details

The frequency controlled horizontal drive (H.D.) pulse from the Deflection board is supplied to the base of switching amplifier Q1 through pin No. 1 of EVF connector CN102 and terminal No. 3 of CN1.
The horizontal(H) deflection sawtooth current obtained at the collector of Q1 is supplied to the H.deflection coil through C9, L2, VL3 (H.SIZE) and terminal No. 2 of CN2.
The flyback pulse obtained at the collector of Q1 is also fed to the high voltage circuit.

8-3 High Voltage Circuit

Outline

This circuit generates high voltages for cathode ray tube (CRT) electrodes.

Details

The flyback pulse generated in the horizontal(H) deflection circuit is supplied to primary winding of the flyback transformer (FBT) in high voltage pack T1 to step up the flyback pulse to necessary level. The boosted pulses obtained at the secondary winding of the transformer are rectified to generate high voltages.
+4.5KV obtained by rectifying the boosted pulse is supplied to the CRT anode.
+600V obtained by rectifying the boosted pulse is supplied to grid-3(G3) of the CRT through VR1 (FOCUS). The voltage of grid-2(G2) is derived by dividing +600V by VR1, R1 and R2.
The voltage of grid-1(G1) is derived by rectifying the negative pulse from the FBT. Then the rectified -55V is supplied to G1 through VR2 (BRIGHTNESS) together with the video signal supplied from the video amplifier circuit.
The heater voltage for CRT is supplied +4.8V and +7.6V from the Deflection board through EVF connector CN102 and CN1.

9 Camera Remote Control Unit (Option) : WV-CR10E/N

Outline

This camera remote control unit, WV-CR10E/N is used to control the camera operations remotely with the detached EVF unit for Power Zoom, Power Focus, Auto Focus Auto/Man Selection, Fade and VTR Start/Stop Switch (REC).

Details

9-1 Power Zoom

The switch for WIDE and TELE is the seesaw type switch so that only either switch is ON or OFF. The WIDE switch, SW6 is connected with the base of Q2 on Audio/Lens Control board through camera remote connector CN105.
The TELE switch, SW7 is connected with the base of Q4 on Audio/Lens Control board through camera remote connector CN105.
When the WIDE switch, SW6 is closed, the base of Q2 becomes LOW and Q2 is turned ON. The base of Q4 is HIGH so that Q004 is OFF. The base of Q3 also becomes LOW so that Q3 is turned ON and drives the power zoom motor for WIDE.
When the TELE switch, SW7 is closed, the base of Q4 on Audio/Lens Control board becomes LOW and Q4 is turned ON. The base of Q2 is HIGH so that Q2 is OFF.

The base of Q1 also becomes LOW so that Q1 is turned ON and drives the power zoom motor for TELE.

The power zoom switch on the adjustable handle grip has priority.

When the WIDE switch on the camera is pressed during the TELE switch, SW7 on the camera remote control unit is closed, the base of Q005 on the camera remote control unit becomes LOW so that Q005 is OFF and the WIDE switch on the grip is activated.

When the TELE switch on the grip is pressed during the WIDE switch, SW6 on the camera remote control unit is closed, the base of the Q004 on the camera remote control unit becomes LOW so that Q004 is OFF and the TELE switch on the grip is activated.

9-2 Auto-Manual Selection

When the AUTO/MAN selection switch, SW3 is placed at AUTO side, Q003 on the camera remote control unit is OFF so that the collector of Q003 is LOW.

The signal at pin 2 of camera remote connector CN105 is (Vs + 0V DC) which is supplied to AF (Auto Focus) connector through Audio/Lens Control board.

When the AUTO/MAN selection switch, SW3 is placed at MAN side, Q003 is ON so that the collector of Q003 is HIGH.

The signal at pin 2 of camera remote control connector CN105 is (Vs + HIGH V DC) which is supplied to AF connector through deflection board.

9-3 Power Focus

The vertical scanning start pulse Vs (positive polarity) is supplied from pin 2 of camera remote connector CN105 to the base of Q001 so that the positive polarity Vs is inverted and the negative one is obtained at the collector of Q001.

The negative polarity Vs is also supplied from the collector of Q001 to the base of Q002 so that the positive polarity Vs is obtained at the collector of Q002.

The signal at pin 4 of camera remote connector CN105 is obtained according to the position of the power focus switch as;

. By pressing SW1, FAR : Positive Polarity Vs
. By pressing SW2, NEAR : Negative Polarity Vs
. By no pressing SW, STOP : HIGH V DC

and is supplied to pin 1 of Lens connector, CN107 through Audio/Lens Control board.

9-4 FADE and REC Switch

When the FADE switch SW5 is pressed, +4.8V DC is supplied to pin 5 of camera remote connector CN105. This +4.8V DC is supplied to process board through Audio/Lens Control board and the camera is ready for FADE-IN or FADE-OUT.

When the REC switch SW4 is pressed, the low level is supplied to the pin 5 of CN105. This low level is supplied to the process board through Audio/Lens Control board and the camera becomes the REC-PLAY or REC-PLAY-PAUSE mode.

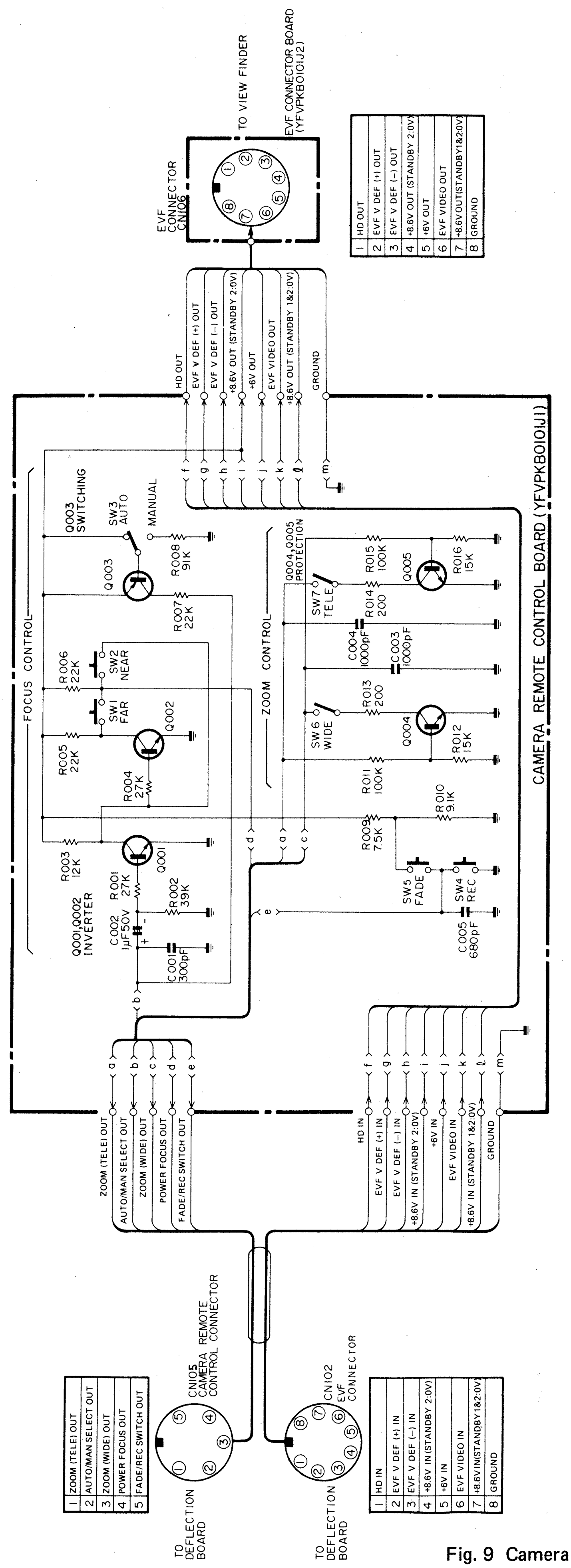

TO VIEW FINDER
EVF CONNECTOR BOARD (YFVPKB010J2)
EVF CONNECTOR CN106
1 HD OUT
2 EVF V DEF (+) OUT
3 EVF V DEF (−) OUT
4 +8.6V OUT (STANDBY 2:0V)
5 +6V OUT
6 EVF VIDEO OUT
7 +8.6V OUT (STANDBY 1&2:0V)
8 GROUND
CAMERA REMOTE CONTROL BOARD (YFVPKB010J1)
FOCUS CONTROL
ZOOM CONTROL
Q001,Q002 INVERTER
Q003 SWITCHING
Q004,Q005 PROTECTION
SW1 FAR
SW2 NEAR
SW3 AUTO
MANUAL
SW4 REC
SW5 FADE
SW6 WIDE
SW7 TELE
Q001
Q002
Q003
Q004
Q005
R001 27K
R002 39K
R003 12K
R004 27K
R005 22K
R006 22K
R007 22K
R008 91K
R009 7.5K
R010 9.1K
R011 100K
R012 15K
R013 200
R014 200
R015 100K
R016 15K
C001 300pF
C002 1μF50V
C003 1000pF
C004 1000pF
C005 680pF
ZOOM (TELE) OUT
AUTO/MAN SELECT OUT
ZOOM (WIDE) OUT
POWER FOCUS OUT
FADE/REC SWITCH OUT
HD IN
EVF V DEF (+) IN
EVF V DEF (−) IN
+8.6V IN (STANDBY 2:0V)
+6V IN
EVF VIDEO IN
+8.6V IN (STANDBY 1&2:0V)
GROUND
CN105 CAMERA REMOTE CONTROL CONNECTOR
1 ZOOM (TELE) OUT
2 AUTO/MAN SELECT OUT
3 ZOOM (WIDE) OUT
4 POWER FOCUS OUT
5 FADE/REC SWITCH OUT
CN102 EVF CONNECTOR
1 HD IN
2 EVF V DEF (+) IN
3 EVF V DEF (−) IN
4 +8.6V IN (STANDBY 2:0V)
5 +6V IN
6 EVF VIDEO IN
7 +8.6V IN (STANDBY 1&2:0V)
8 GROUND
TO DEFLECTION BOARD
TO DEFLECTION BOARD

Fig. 9 Camera Remote Control Unit

ORDER NO. VKD83070768C8

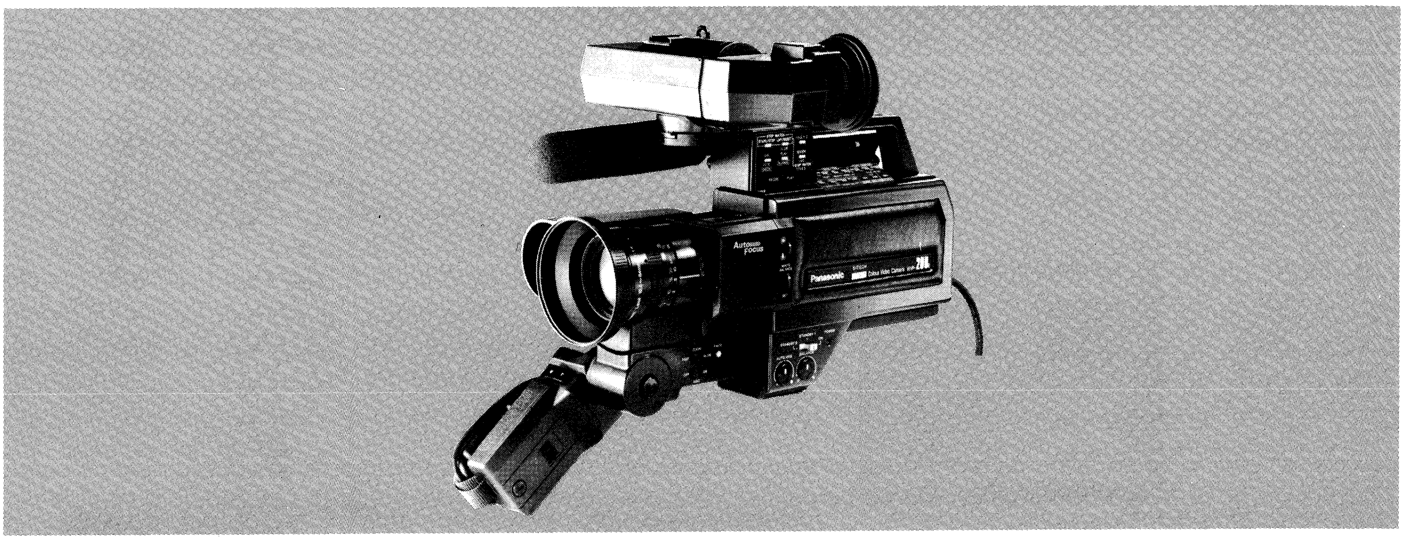
Service Manual

Vol. 2

Adjustment Procedures
Troubleshooting Guides

Colour Video Cameras

WVP-200E/WVP-200N



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National/Panasonic

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

1. TEST EQUIPMENT REQUIRED

The following equipment is required for adjustment of WVP-200 colour camera.

- Oscilloscope (dual trace, delayed, 25MHz bandwidth, with three probes)
- Digital voltmeter (DVM)
- Frequency counter
- Vectorscope
- Colour video monitor
- Tripod
- Lighting (140 footcandles (1400 lux), 3200° K)
- Light meter
- Logarithmic gray scale chart (Part No. YWV2310RB99) (Fig. 1-1).

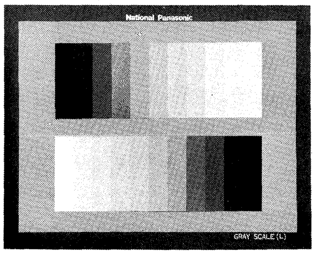

National Panasonic
GRAY SCALE (L)

Fig. 1-1

- Colour chart (Part No. YWV2100RB98) (Fig. 1-2)

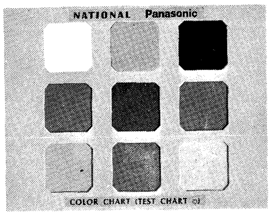
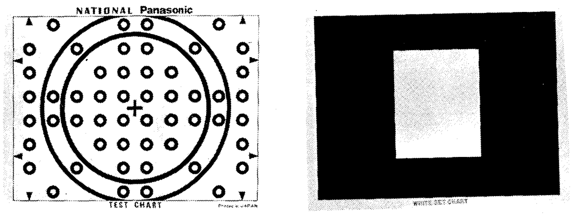

NATIONAL Panasonic
COLOR CHART (TEST CHART C)

Fig. 1-2

- Ball/White set chart (Part No. YWV2100RB03) (Fig. 1-3)


NATIONAL Panasonic
TEST CHART
WHITE SET CHART

Ball chart

White set chart

Fig. 1-3

Test equipment denoted by shaded outlines are not required if only pick-up tube is replaced.

2. DISASSEMBLY PROCEDURE FOR ADJUSTMENT

2-1 Camera Unit

- Turn OFF the power.
- Remove two screws on rear side of the side cover holding the both side covers. (Fig. 2-1-1)

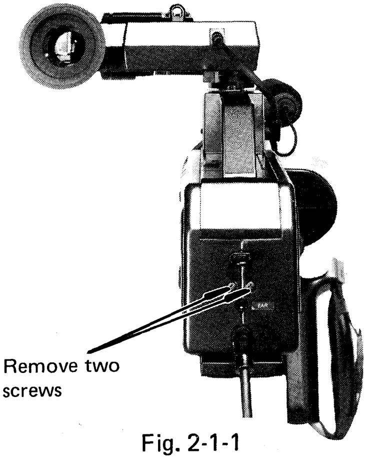

Remove two screws

Fig. 2-1-1

- Remove the both side covers by sliding them backward. (Fig. 2-1-2, Fig. 2-1-3)

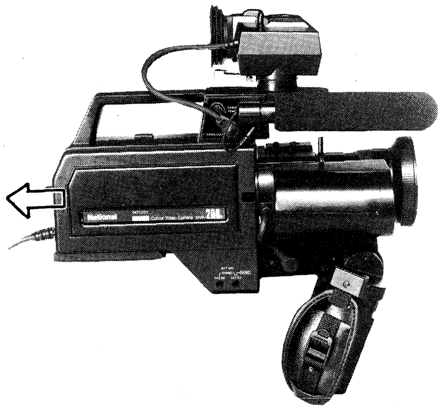


Fig. 2-1-2

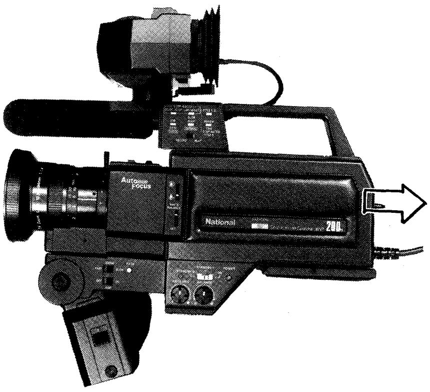


Fig. 2-1-3

- Remove two screws which hold the each of Process board and Deflection board in order to gain access to the desired circuitry.

(A) For right side PCB (Viewed from the front)
Process Board (YFVPKA2003EA)

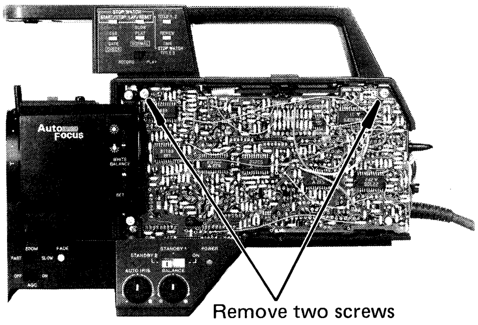
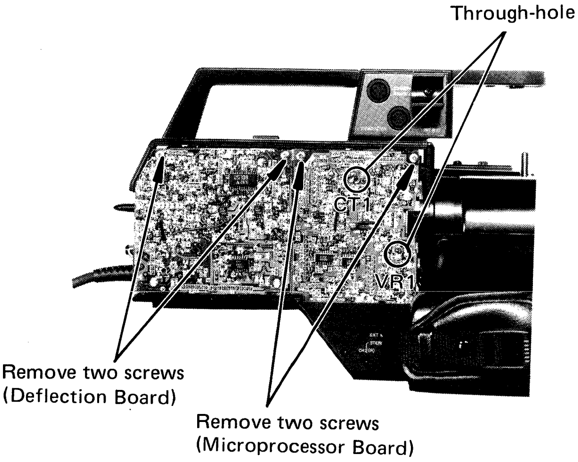

Remove two screws

Fig. 2-1-4

(B) For left rear side PCB (Viewed from the front)
Deflection Board (YFVPKA2001EA)

(C) For left front side PCB (Viewed from the front)
Microprocessor Board (YFVPKA2004EA)



Remove two screws (Deflection Board)

Remove two screws (Microprocessor Board)

Fig. 2-1-5

Note : Do not remove two screws holding the Microprocessor board unless when adjusting back-focus and replacing the pick-up tube.
(See page 4)
When adjusting Microprocessor board, remove two screws which holding Microprocessor board and disconnect CN1 and CN2.

Caution : The plug (CN2) of Key board (B) becomes poor contact due to shave out the carbon conductor from plastic face plate, when connection and disconnection are repeated several times. In such a case, cut 2 ~ 3 mm of the edge portion of plug for restoration of the contact. (Fig. 2-1-6)

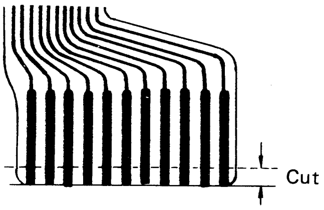
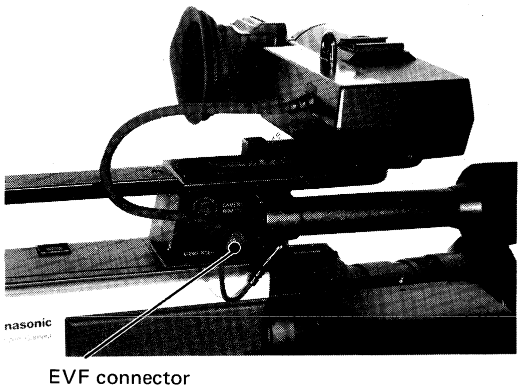


Fig. 2-1-6

2-2 Viewfinder (EVF) Unit

- Disconnect the viewfinder connector.
- Unlock the EVF lock lever. (Fig. 2-2-1)



EVF connector

Fig. 2-2-1

- Remove the viewfinder by pulling it forward while pressing EVF release button. (Fig. 2-2-2)

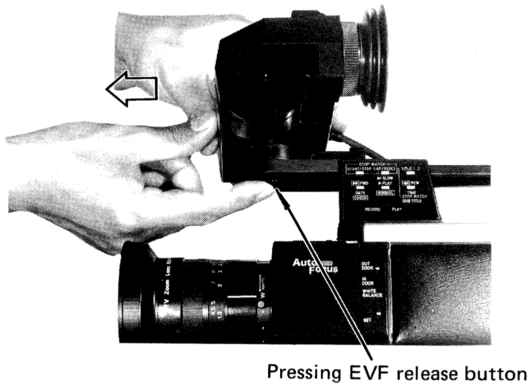

Pressing EVF release button

Fig. 2-2-2

- Remove two screws from the bottom and remove bottom cover. (Fig. 2-2-3, Fig. 2-2-4)

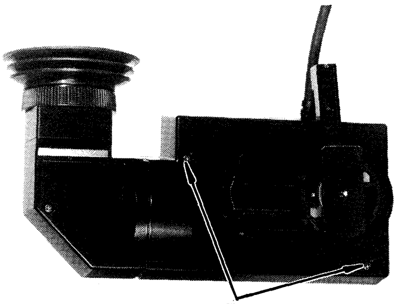

Remove two screws

Fig. 2-2-3

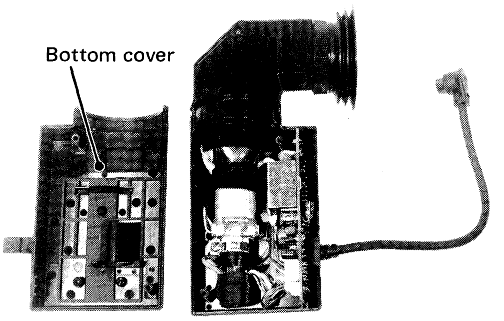

Bottom cover

Fig. 2-2-4

2-3 Auto Focus Lens

- Disconnect the lens connector.
- Make sure that the microphone is removed.
- Remove the lens hood by turning it counterclockwise.
- While depressing the lens release button backward, remove the lens by turning it clockwise (approximately 60°). (Fig. 2-3-1)

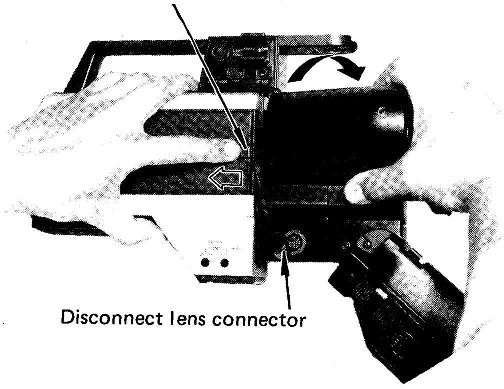

Depressing the lens release button backward
Disconnect lens connector

Fig. 2-3-1

- Remove four screws on the front portion of the cover and remove the two screws on the upper portion of the cover. (Fig. 2-3-2, Fig. 2-3-3, Fig. 2-3-4)

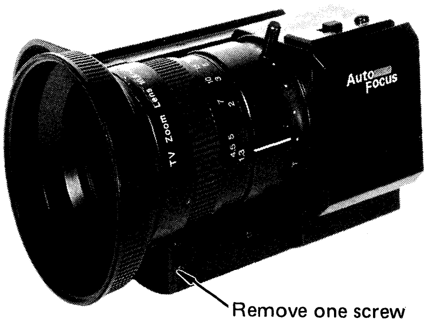

Auto Focus
TV Zoom Lens
Remove one screw

Fig. 2-3-2

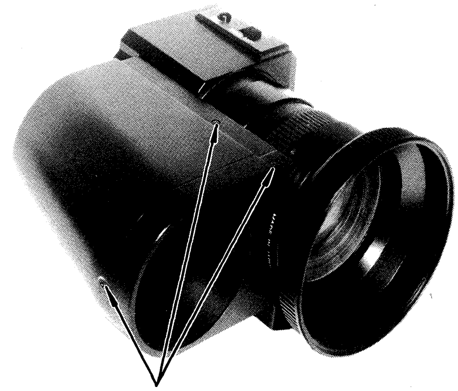

Remove three screws

Fig. 2-3-3

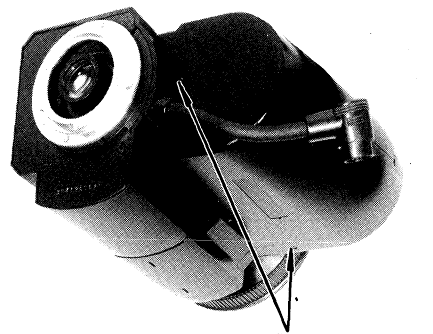

Remove two screws

Fig. 2-3-4

- Remove the front cover. (Fig. 2-3-5)

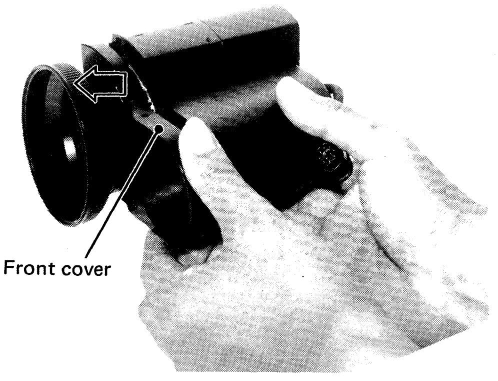

Front cover

Fig. 2-3-5

- Remove the upper cover. (Fig. 2-3-6)

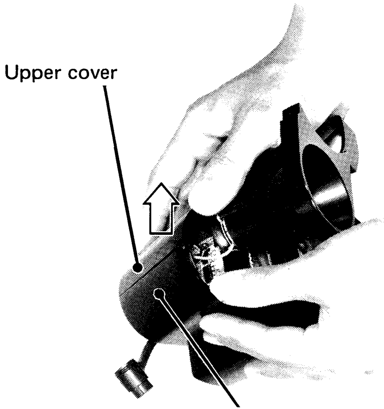

Upper cover
Bottom cover

Fig. 2-3-6

Note : When adjusting the Auto focus lens unit, put back only the front cover and tighten one screw temporarily for holding the front cover. (Fig. 2-3-7)

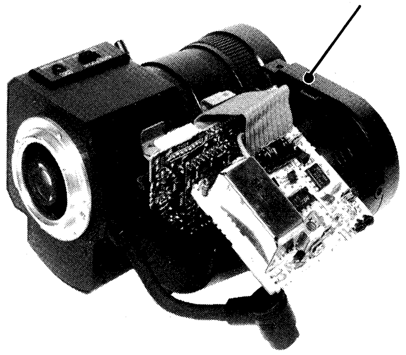

Replace front cover Temporarily

Fig. 2-3-7

Note : When replacing the upper cover, make sure that the printed circuit boards are in the groove of the case. (Fig. 2-3-8)

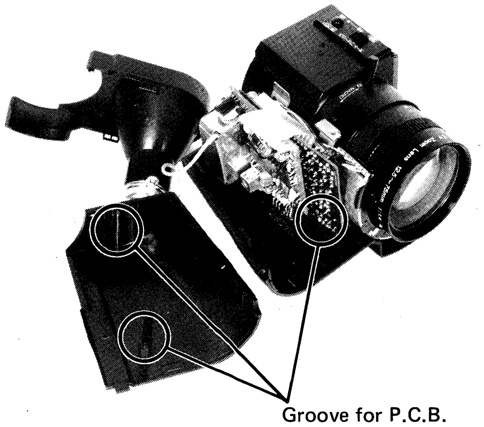

Groove for P.C.B.

Fig. 2-3-8

3. REPLACEMENT PROCEDURE

3-1 Pick-up Tube Assembly Replacement

Note : When replacing pick-up tube, surely replacing together with deflection coil and FAMOS IC (FAMOS Kit).

- Disassemble the camera as previously described in Section 2 "DISASSEMBLY PROCEDURE FOR ADJUSTMENT"on page 1.
- Remove the EVF and Microphone from the camera. (Refer to 2-2 and 2-3 on page 3)
- Disconnect the CN1 and CN2 on microprocessor board. (Fig. 3-1-1)

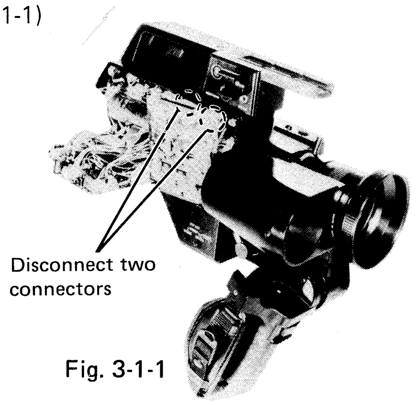

Disconnect two connectors

Fig. 3-1-1

- Unsolder the ground wire of the shield cover, remove one screw holding shield cover A and B and remove them. (Fig. 3-1-2)

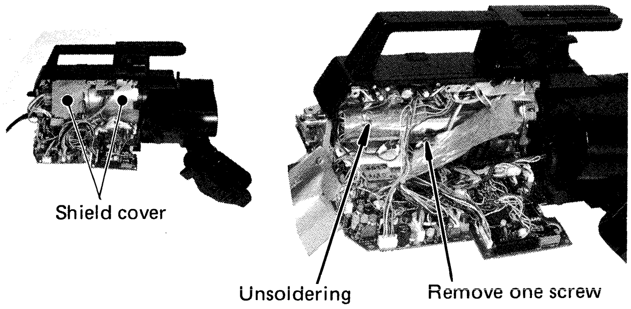

Shield cover
Unsoldering
Remove one screw

Fig. 3-1-2

- Remove two screws and unsolder two points holding the shield plate of the coil holder and shield plate of the preamplifier board holder and remove these shield plates. (Fig. 3-1-3)

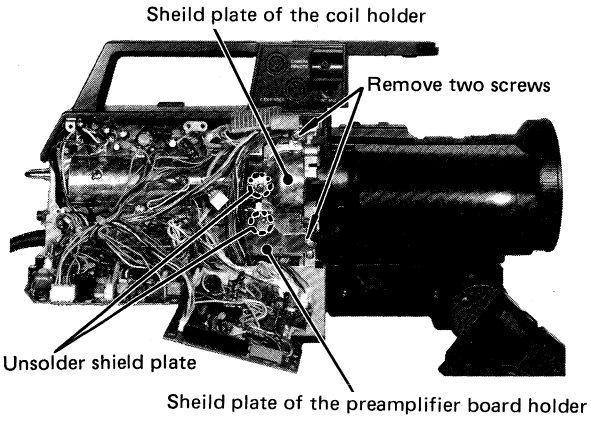

Sheild plate of the coil holder
Remove two screws
Unsolder shield plate
Sheild plate of the preamplifier board holder

Fig. 3-1-3

- Remove two screws holding the shield plate and remove the shield plate by pulling it backward, while pulling the other side of shield plate forward.
- Remove preamplifier shield case by pulling it outward. (Fig. 3-1-4)

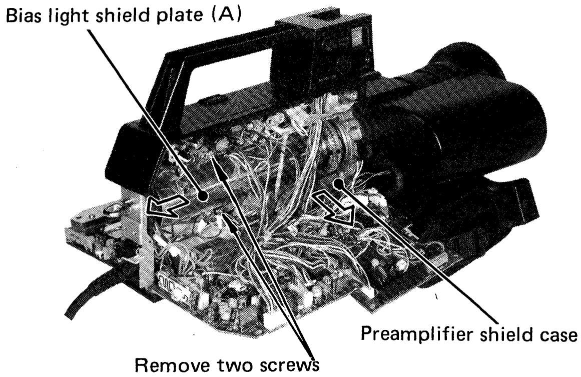

Bias light shield plate (A)
Preamplifier shield case
Remove two screws

Fig. 3-1-4

- Unsolder the target lead.
- Disconnect pick-up tube socket from the pick-up tube.
- Remove two screws holding pick-up tube holder.
- Remove the backfocus adjusting ring from the coil holder by turning it counterclockwise (Viewed from the rear) (Fig. 3-1-5)

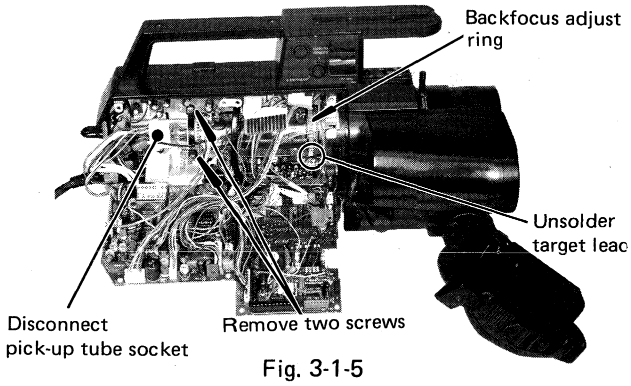

Backfocus adjust ring
Unsolder target lea
Disconnect pick-up tube socket
Remove two screws

Fig. 3-1-5

- Remove the pick-up tube and deflection coil assembly by pulling it backward. (Fig. 3-1-6)

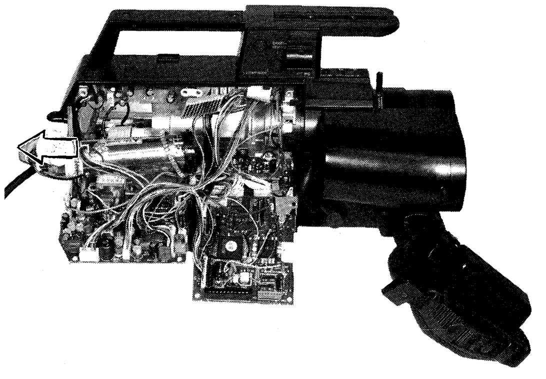


Fig. 3-1-6

- Take out the backfocus adjusting ring and pick-up tube holder from the pick-up tube and deflection coil assembly. (Fig. 3-1-7)

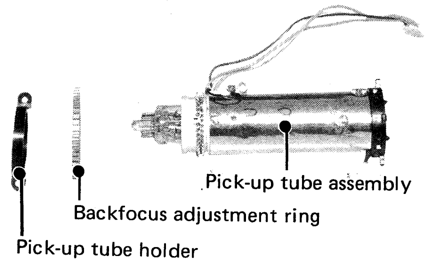

Pick-up tube assembly
Backfocus adjustment ring
Pick-up tube holder

Fig. 3-1-7

- Clean the faceplate of the new pick-up tube assembly with the lens cleaning tissue or cloth.
- Reinstall the backfocus adjusting ring and pick-up tube holder to pick-up tube assembly. (Fig. 3-1-7)
- Reinstall the pick-up tube assembly into the chassis. (Fig. 3-1-8)

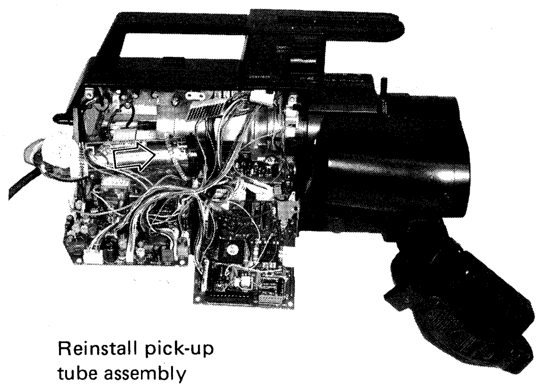

Reinstall pick-up tube assembly

Fig. 3-1-8

Note : 1. The target lead has to be positioned downward.

2. Make sure that the protruding part of the deflection coil engages the recessed part of the coil holder. (Fig. 3-1-9)

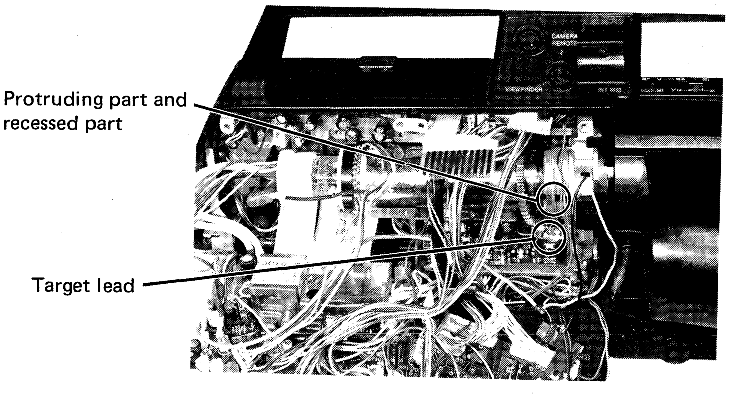

Protruding part and recessed part
Target lead
CAMERA REMOTE
VIEWFINDER

Fig. 3-1-9

- Reinstall the pick-up tube holder by fixing two screws and connect the pick-up tube socket.
- Reinstall the backfocus adjusting ring to the coil holder by turning it clockwise (Viewed from rear).
- Solder the target lead. (Fig. 3-1-10)

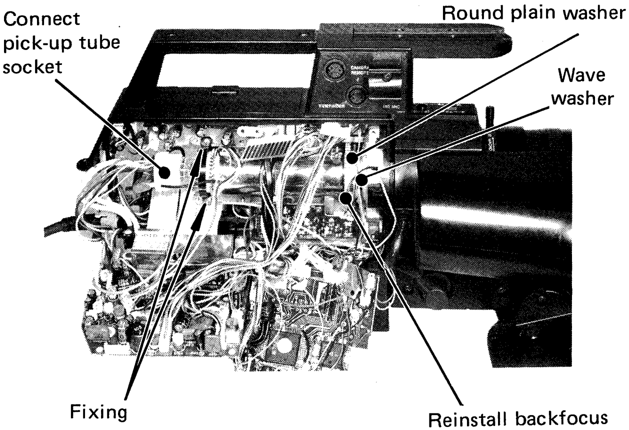

Connect pick-up tube socket
Round plain washer
Wave washer
Fixing two screws
Reinstall backfocus adjusting ring

Fig. 3-1-10

Note : Make sure that the wave washer and round plain washer are placed into prescribed position.

- Remove two screws on the shield case cover on the process board and remove the shield case cover. (Fig. 3-1-11)

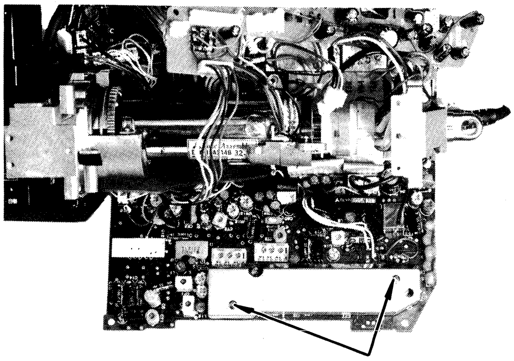

Remove two screws

Fig. 3-1-11

- Remove the FAMOS IC, IC6 from IC socket and replace to the new one. (Fig. 3-1-12)

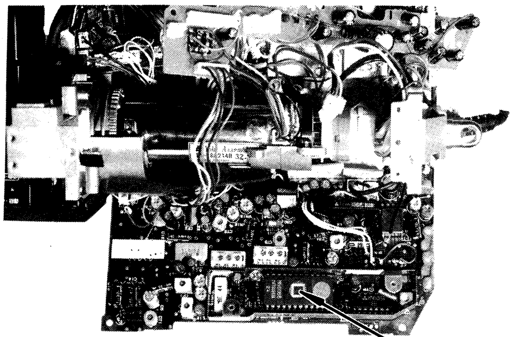


Fig. 3-1-12

- Reinstall the shield case cover.
- After replacing the pick-up tube assembly and FAMOS IC, adjust the camera while referring to Section 4. "ADJUSTMENT PROCEDURE" on page 11

3-2 Bias Light Assembly Replacement

- Disassemble the pick-up tube as previously described in section 3-1 "Pick-up Tube Assembly Replacement" on page 4.
- Remove the round plain washer and the wave washer. (Fig. 3-1-10)
- Unsolder the two wires. (Fig. 3-2-1)

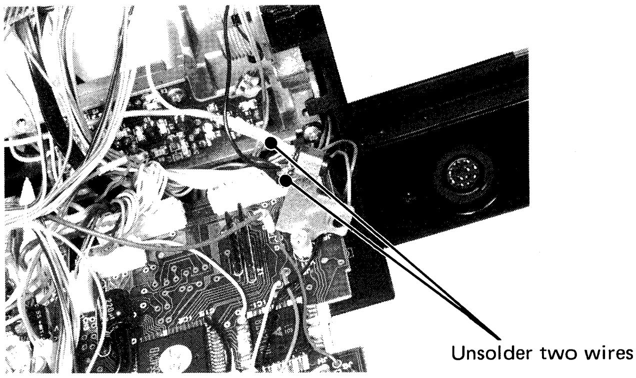

Unsolder two wires

Fig. 3-2-1

- Push the bias light assembly and remove it. (Fig. 3-2-2)

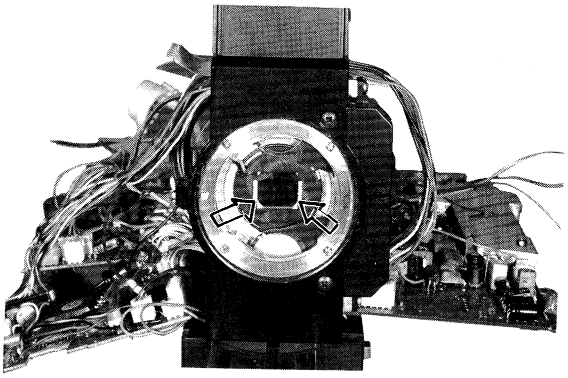


Fig. 3-2-2

- Clean the both faceplates of the bias light assembly with the lens cleaning tissue or cloth.
- Pass the two wires through the hole. (Fig. 3-2-3)

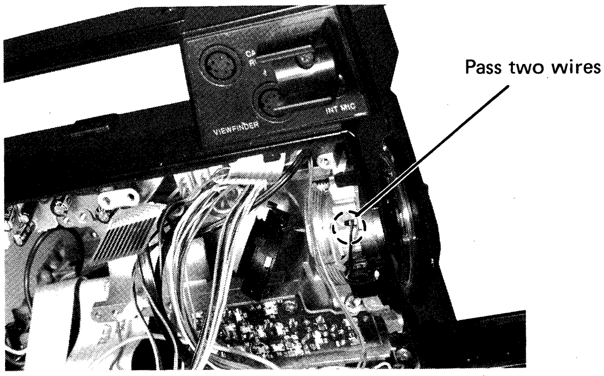

Pass two wires

Fig. 3-2-3

- Reinstall the bias light assembly into the chassis. (Fig. 3-2-4)

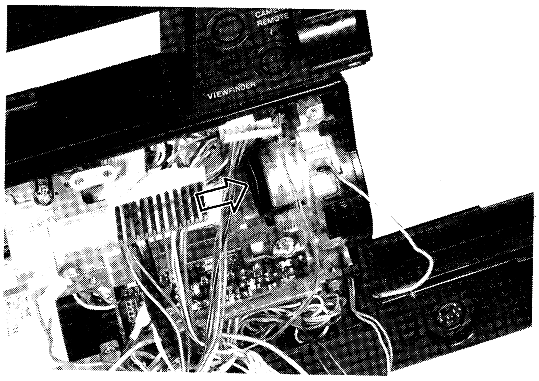


Fig. 3-2-4

- Solder the two wires.(Fig. 3-2-1)
- Reinstall the round plain washer and the wave washer to the chassis.
- Reinstall the pick-up tube as described in section 3-1 "Pick-up Tube Assembly Replacement" on page 4.

3-3 Display key Board Replacement

- Disassemble the camera as previously described in Section 2 "DISASSEMBLY PROCEDURE FOR ADJUSTMENT" on page 1.
- Remove the Microphone and EVF from camera. (Refer to 2-2 and 2-3 on page 2)
- Remove two screws holding the handle cover and three screws holding EVF mounting on the upper cover. And remove the handle cover by pulling it upward and EVF mounting. (Fig. 3-3-1)

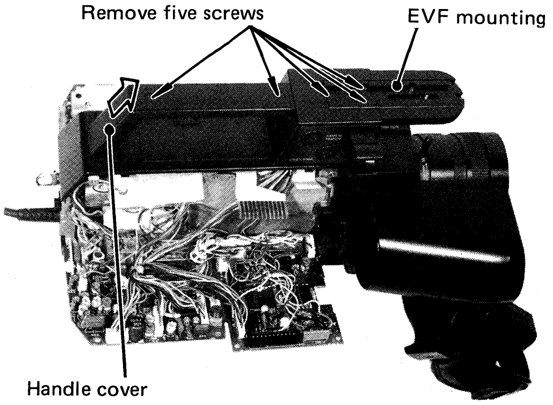

Remove five screws
EVF mounting
Handle cover

Fig. 3-3-1

- Remove one screw holding the microphone mounting base and one screw holding upper cover. (Fig. 3-3-2)

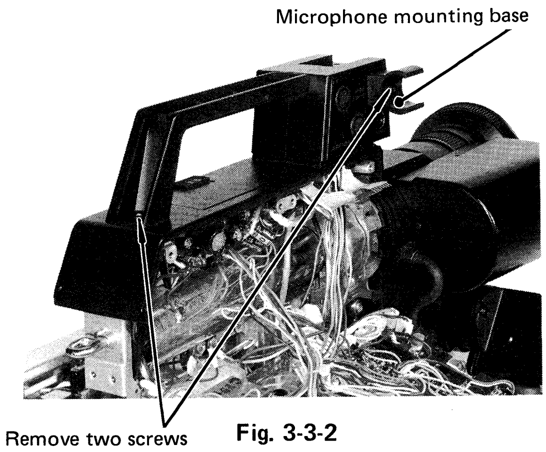

Microphone mounting base
Remove two screws

Fig. 3-3-2

- Lift the rear side of upper cover.
- Remove the key board (A) by pressing the key board locking tabs on the bottom inside of the key board to upward.
- Remove the Microphone connector and EVF board by the same procedure. (Fig. 3-3-3, Fig. 3-3-4)

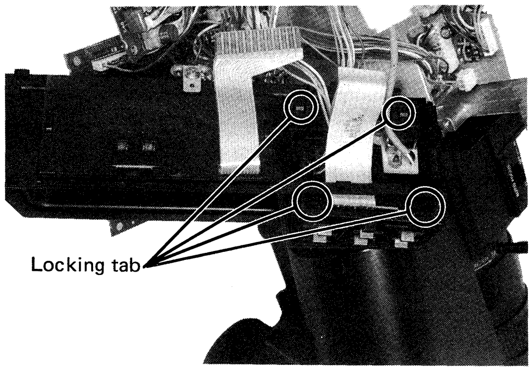

Locking tab

Fig. 3-3-3

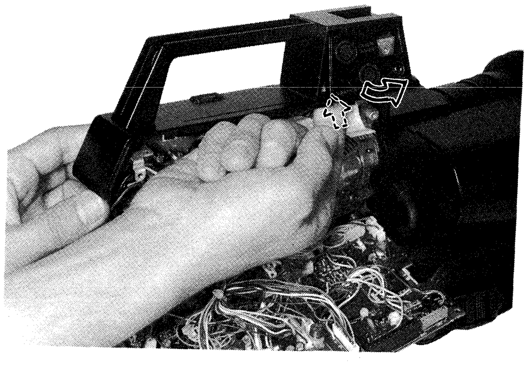


Fig. 3-3-4

- Remove the upper cover by pulling it upward.
- Remove the key board (B) locking pin. (Fig. 3-3-5)

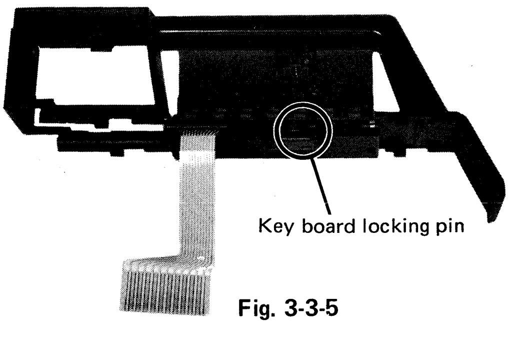

Key board locking pin

Fig. 3-3-5

- Remove the key board (B) by pulling it outward while keeping it slant. (Fig. 3-3-6)

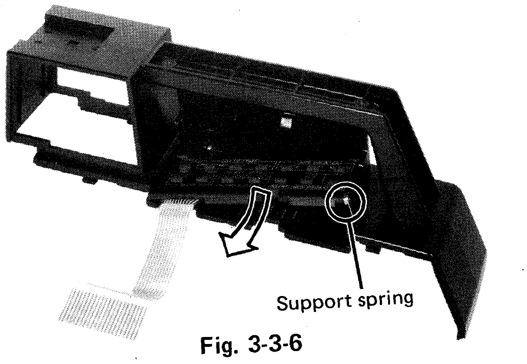

Support spring

Fig. 3-3-6

Note : When replacing the key board (B), make sure that the support spring is installed in prescribed position.

3-4 Microphone Unit Replacement

- Disconnect the microphone connector.
- Remove the microphone by pulling it forward. (Fig. 3-4-1)

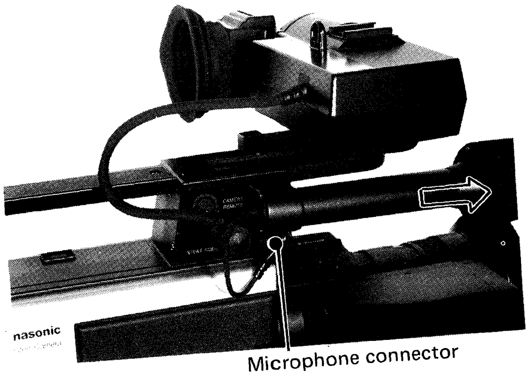

Microphone connector

Fig. 3-4-1

3-5 CRT Replacement

- Disassemble the EVF as previously described in Section 2 "DISASSEMBLY PROCEDURE FOR ADJUSTMENT" on page 1.
- Remove one screw on upper side of CRT case and remove the case. (Fig. 3-5-1, Fig. 3-5-2)

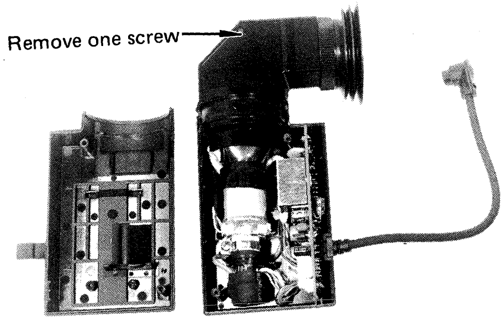

Remove one screw

Fig. 3-5-1

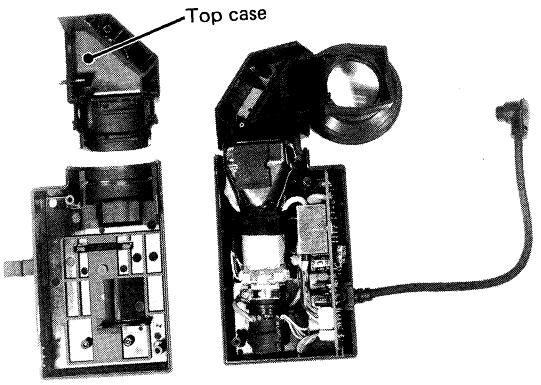


Fig. 3-5-2

- After replacing the parts, reinstall the EVF in revers order of disassembly procedure.

Note : 1. When reinstalling the bottom cover, make sure that the plate spring is attached on the upper cover. (Fig. 3-5-3)

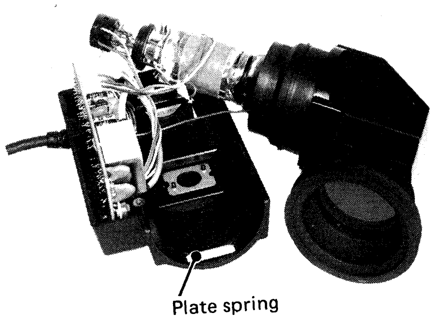


Plate spring

Fig. 3-5-3

Note : 2. When replacing CRT and case assembly, make sure that the CRT socket assembly and printed circuit board are in the groove portion of the bottom cover. (Fig. 3-5-4)

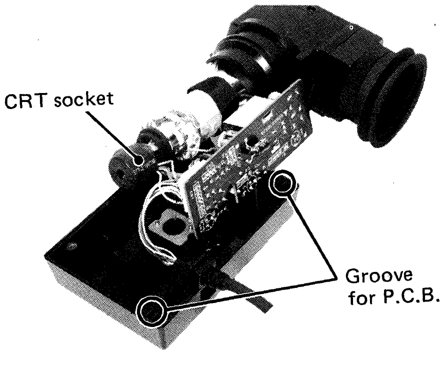

CRT socket
Groove for P.C.B.

Fig. 3-5-4

3-6 Lens Replacement

- Disassemble the auto focus lens as previously described in Section 2 "DISASSEMBLY PROCEDURE FOR ADJUSTMENT" on page 1.
- Remove one screw which hold the bottom cover and remove the bottom cover. (Fig. 3-6-1)

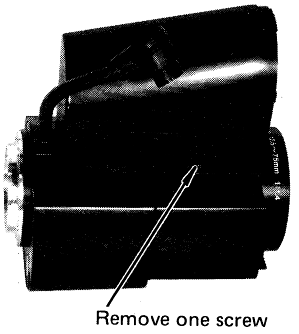

Remove one screw

Fig. 3-6-1

- Disconnect three connectors CN002, CN003 and CN004 and remove the printed circuit board. (Fig. 3-6-2)

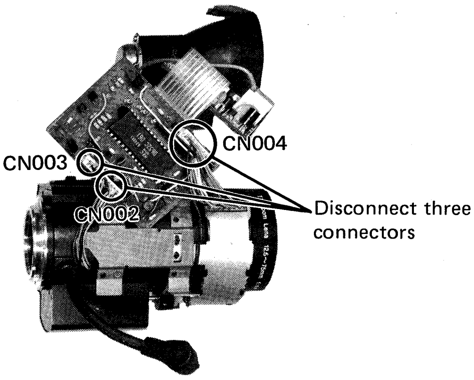

CN003
CN004
CN002
Disconnect three connectors

Fig. 3-6-2

- Remove four screws which hold the cover holder and remove the cover holder.
- Remove three screws which hold the position sensor cover and remove the position sensor cover. (Fig. 3-6-3)

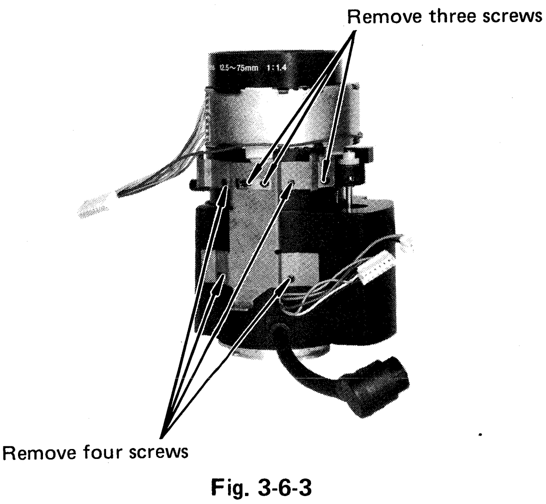

Remove three screws
Remove four screws

Fig. 3-6-3

- Remove three screws which hold the iris back cover and insert the standard screw driver to the groove, then remove the iris back cover. (Fig. 3-6-4, Fig. 3-6-5)

Note : Do not remove four screws except replacing the bayonet lens mount.

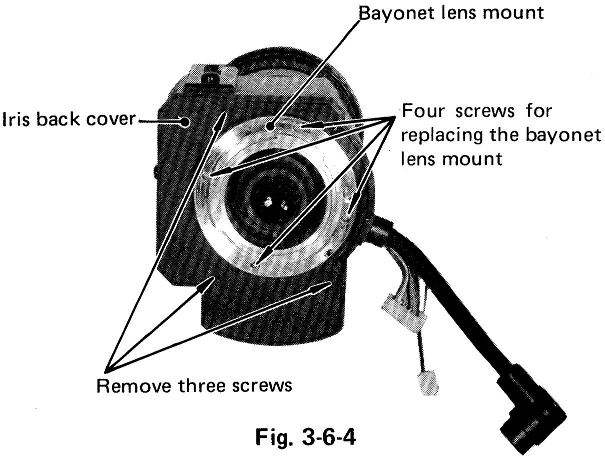

Bayonet lens mount
Iris back cover
Four screws for replacing the bayonet lens mount
Remove three screws

Fig. 3-6-4

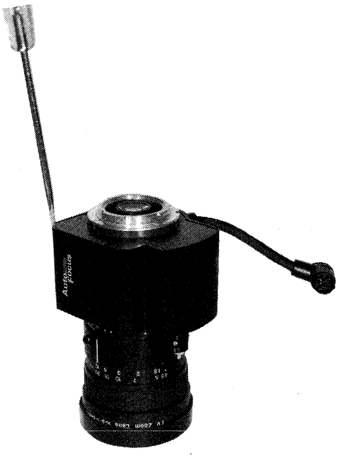
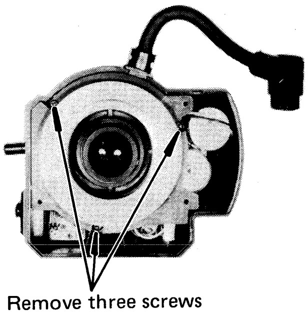


Fig. 3-6-5

- Remove three screws which hold the lens mounting assembly and remove the lens mounting assembly. (Fig. 3-6-6)


Remove three screws

4. ADJUSTMENT PROCEDURE

4-1 Connection and Setting Up for Adjustment

Connection

- Connect the camera cable from the camera to the power supply.
- Connect the video cable from the power supply to the colour monitor.
- Terminate the colour monitor video input in 75 ohm. (Fig. 4-1-1)

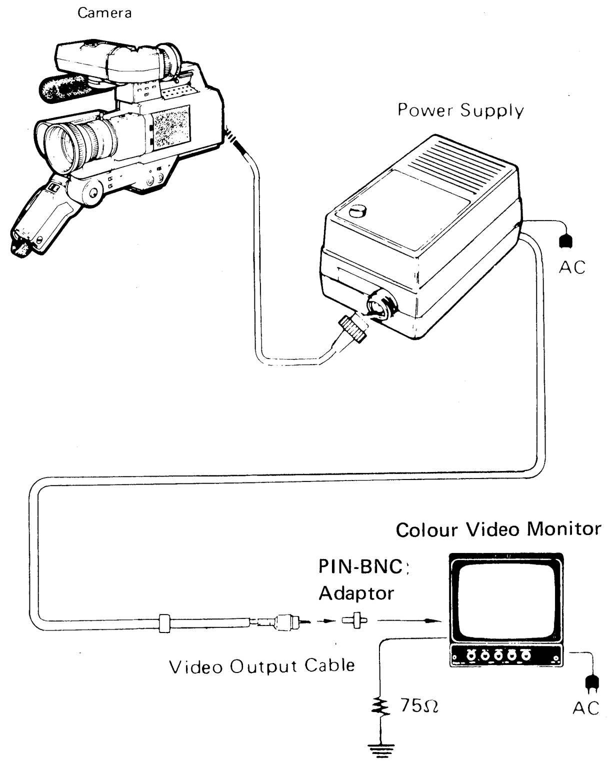


Fig. 4-1-1

Disassembling

- Disassemble the camera while referring to Section 2. "DISASSEMBLY PROCEDURE FOR ADJUSTMENT" on page 1.
- Remove two screws on the shield case cover on the process board and remove shield case cover. (Refer to Fig. 3-1-11 on page 6.)

Setting up

- Light : Incident light intensity on chart : 140 footcandles (1400 lux)
  Colour temperature: 3200°K

- Test Charts : Logarithmic gray scale chart (YWV2310RB99)
  Colour chart (YWV2100RB98)
  Flat white chart
  Ball/white set chart (Window chart) (YWV2100RB03)

Steps denoted by shaded outlines do not have to be performed if only pick-up tube is replaced.

Position of controls and switches on the camera

Set the controls and switches on the camera as follows;

Indoor/Outdoor switch	Lower (INDOOR) position
White balance switch	Upper (WHITE BALANCE) position
Standby (Power) switch	Right (ON) position
Auto Iris control	Centre (click) position
Colour balance control	Centre (click) position
AGC ON/OFF switch	OFF position
Auto Focus switch	OFF position
YL ON/OFF switch (SW1 on process board)	ON position

Note : TP in the manual refers to a test point on the printed circuit board.

4-2 Camera Unit Adjustment

- Refer to page 26 and 27 for the test points and adjusting controls.

  Caution : Do not set the white balance during the adjustment.

(1) +7.6V adjustment

Test point :	TP4 (+7.6V)	Deflection board
Adjust :	VR1 (+7.6V ADJ)	Deflection board

- Connect the digital voltmeter to the +7.6V TP4.
- Adjust +7.6V ADJ VR1 for 7.6V ±0.01V.

(2) 4.43MHz adjustment

Test points:	TP12 (4.43MHz)	Process board
	TP13 (VCO)	Process board
Adjusts:	CT5 (4.43MHz ADJ)	Process board
	VL15 (VCO ADJ)	Process board

- Connect the frequency counter to the 4.43MHz TP12.
- Adjust 4.43 MHz ADJ CT5 for 4.433619Hz ± 10Hz.
- Connect the digital voltmeter to the VCO TP13.
- Adjust VCO ADJ VL15 for 3.0V ± 0.2V.

(3) Horizontal hold adjustment

Test point :	TP6 (AFC)	Deflection board
Adjust :	VR12 (H.HOLD)	Deflection board

- Connect the digital voltmeter to AFC TP6.
- Adjust H.HOLD VR12 for 2.6V ±0.1V.

(4) Target voltage adjustment

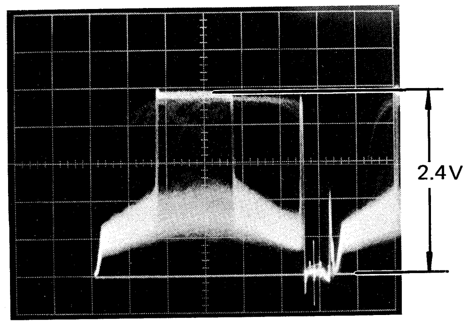
Test point :	TP5 (VT)	Deflection board
Adjust :	VR10 (TARGET)	Deflection board

- Connect the digital voltmeter to VT TP5.
- Adjust TARGET VR10 so that the voltage at VT TP5 becomes 50.9V ± 0.2V.

(5) Beam current adjustment

Test point :	TP1 (PREAMP OUT)	Process board
Adjust :	VR14 (BEAM)	Deflection board

- Connect the oscilloscope to PREAMP OUT TP1.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board.)
- Aim the camera at the scene which contains a high intensity object and turn the Auto Iris control on the right bottom cover of the camera to Open (●) position.
- Adjust BEAM VR14 until the waveform is clipped at 2.4V$_{p\text{-}p}$ ±0.1V$_{p\text{-}p}$. (Fig. 4-2-1) If the signal does not increase up to 2.4 Vp-p, aim the camera at a brighter object.
- Reset the Auto Iris control to Centre position.



0.5V/DIV, 10μsec/DIV

Fig. 4-2-1

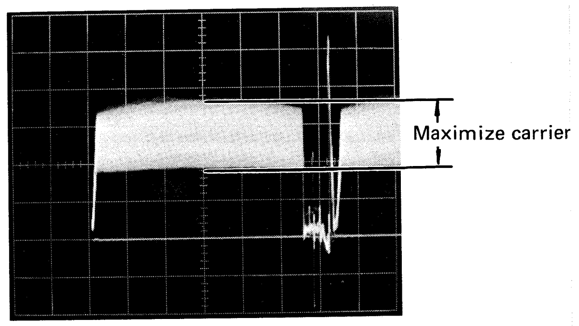
(6) Focus adjustment

Test point :	TP1 (PREAMP OUT)	Process board
Adjust :	VR15 (FOCUS)	Deflection board
Observe :	Colour monitor	

- Aim the camera at white chart.
- Connect the oscilloscope to PREAMP OUT TP1.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board)
- Adjust FOCUS VR15 so that the carrier (5.0MHz) on centre portion of the prevideo signal becomes maximum. (Fig. 4-2-2)

Steps denoted by shaded outlines do not have to be performed if only pick-up tube is replaced.

- Make sure that the minimum green colour on the centre portion of monitor screen.



0.5V/DIV, 10μsec/DIV

Fig. 4-2-2

(7) Backfocus adjustment

Adjust :	Backfocus adjusting ring
Observe :	Colour monitor

- Remove two screws and unsolder two points holding the shield plate for backfocus adjusting ring and remove the shield plate. (Fig. 4-2-3)

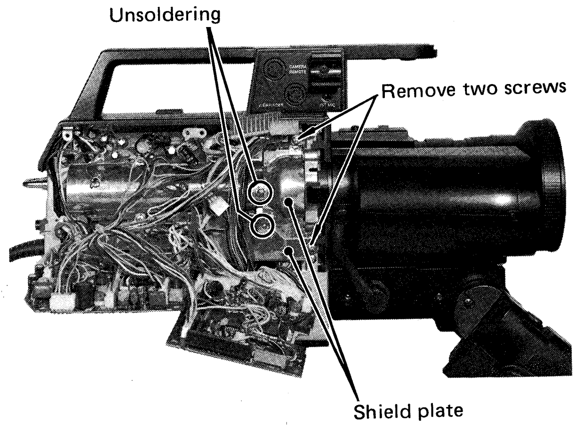


Fig. 4-2-3

- Aim the camera at the dark object further than 6 feet (2m) from the camera.
- Turn the Auto Iris control to the Open (●) position.
- Zoom in (close up/telephoto) and adjust the focus by turning the lens focus.
- Zoom out (Wide angle) and adjust the focus by turning the backfocus adjusting ring. (Fig. 4-2-4)
- Zoom in again and adjust the focus by turning the lens focus.
- Zoom out again and adjust the focus by turning the backfocus adjusting ring.
- Repeat this procedure until the focus tracks throughout the zoom range.
- Reset the Auto Iris control to the centre position.

- Disconnect CN005.
- Remove the bushing of the lens cable from the iris cover.
- Remove two screws which hold the zoom focus motor assembly and remove the zoom focus motor assembly. (Fig. 3-6-7)

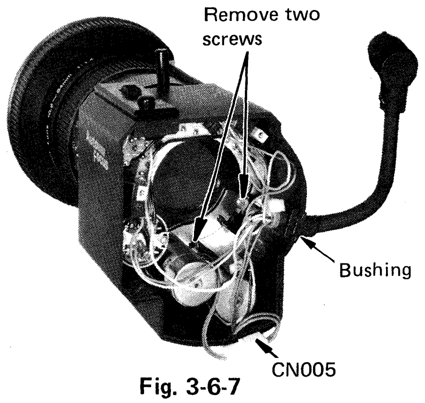

Remove two screws
Bushing
CN005

Fig. 3-6-7

- Press the tab which hold the switch cover and remove the switch cover. (Fig. 3-6-8)

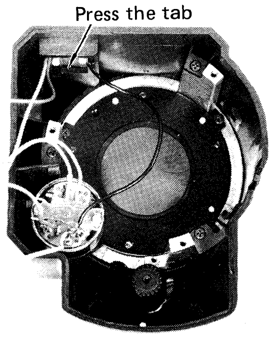

Press the tab

Fig. 3-6-8

- Unsolder the three wires from the ALC assembly and CN004. (Fig. 3-6-9)

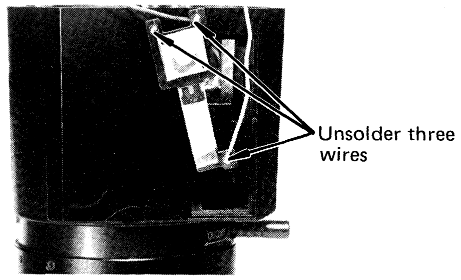

Unsolder three wires

Fig. 3-6-9

- Unsolder the five wires from the ALC assembly.
- Remove two screws which hold the printed circuit board. (Fig. 3-6-10)

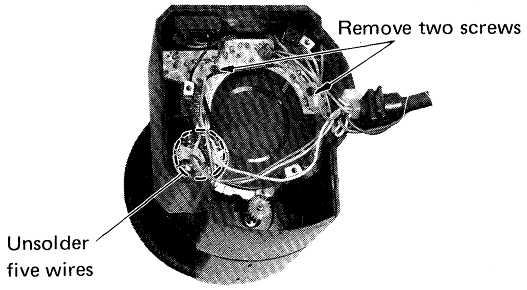

Remove two screws
Unsolder five wires

Fig. 3-6-10

- Remove three screws which hold the ALC assembly and remove the ALC assembly. (Fig. 3-6-11)

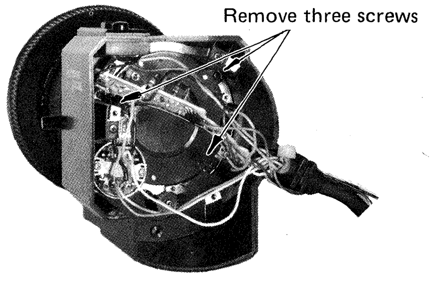

Remove three screws

Fig. 3-6-11

- Remove three screws which hold the iris cover and remove the iris cover. (Fig. 3-6-12)

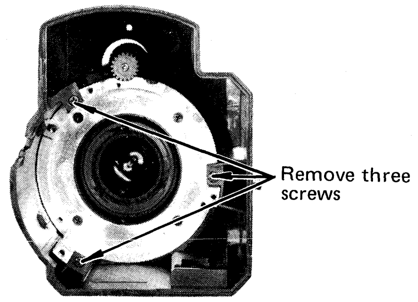

Remove three screws

Fig. 3-6-12

- Remove four screws which hold the iris cover supporter and remove the iris cover supporter. (Fig. 3-6-13)

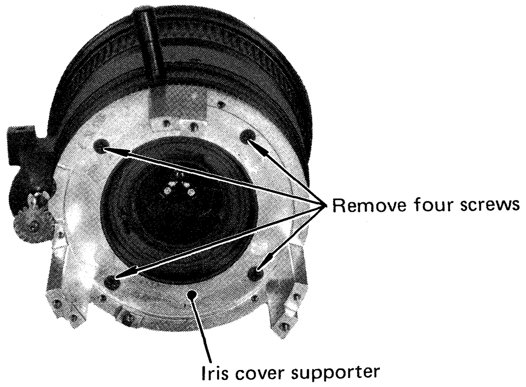

Remove four screws
Iris cover supporter

Fig. 3-6-13

- Remove two screws which hold the focus gear holder assembly remove the focus gear holder assembly and the focus gear assembly. (Fig. 3-6-14)

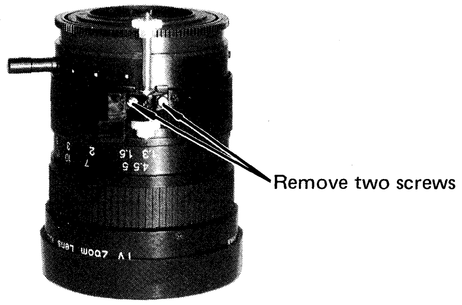
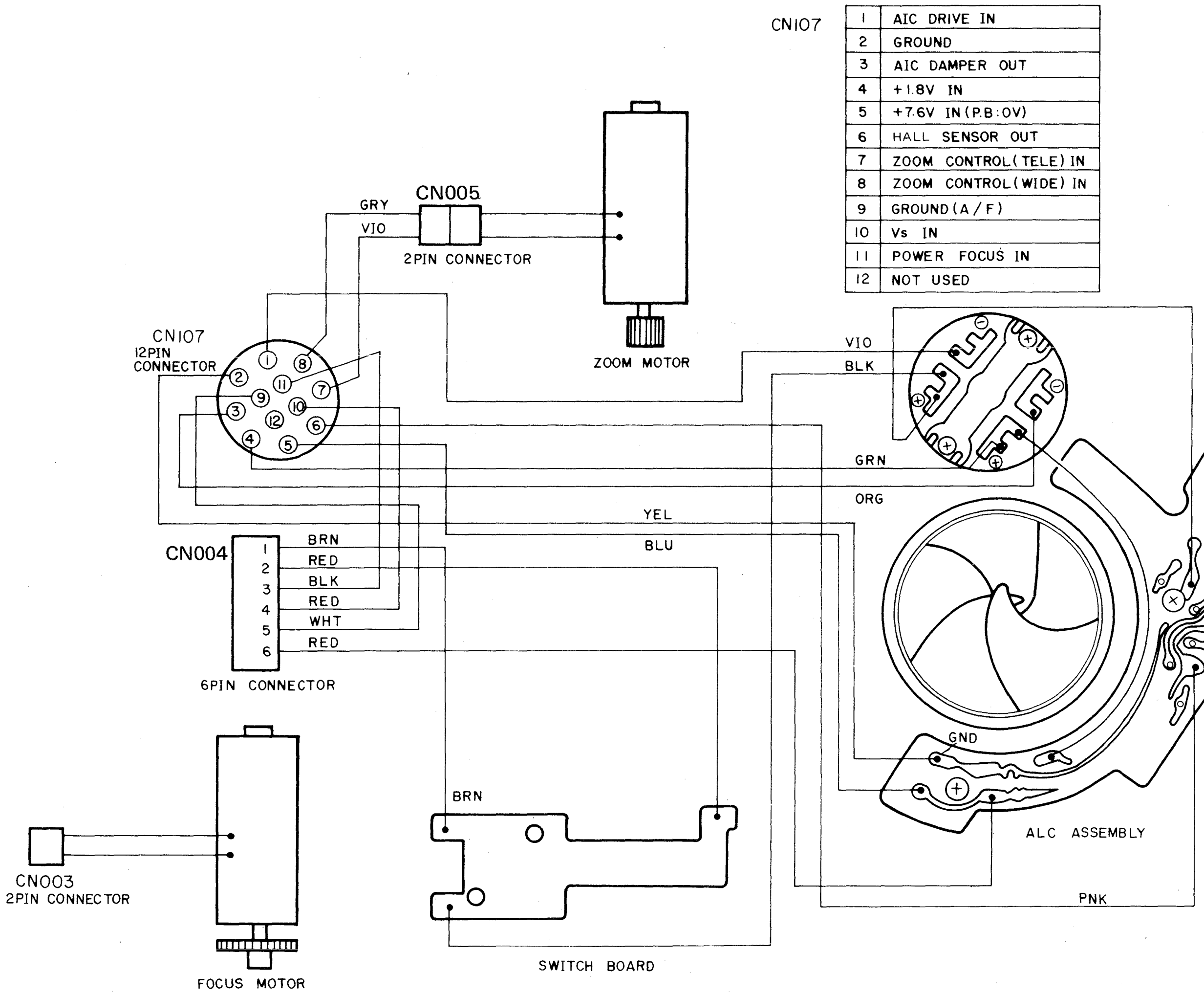

Remove two screws

Fig. 3-6-14

- After replacing the parts, reinstall the lens in reverse order of disassembly procedure.

Note :
1. When replacing the lens mounting assembly, clean the lens with lens cleaning tissue.
2. When replacing the auto focus lens circuit, refer to Fig. 3-6-15 for wiring.


CN107

1	AIC DRIVE IN
2	GROUND
3	AIC DAMPER OUT
4	+1.8V IN
5	+7.6V IN (P.B:0V)
6	HALL SENSOR OUT
7	ZOOM CONTROL (TELE) IN
8	ZOOM CONTROL (WIDE) IN
9	GROUND (A/F)
10	Vs IN
11	POWER FOCUS IN
12	NOT USED

CN005
GRY
VIO
2PIN CONNECTOR
ZOOM MOTOR
CN107
12PIN CONNECTOR
1
2
3
4
5
6
7
8
9
10
11
12
CN004
BRN
RED
BLK
RED
WHT
RED
6PIN CONNECTOR
YEL
BLU
VIO
BLK
GRN
ORG
GND
ALC ASSEMBLY
PNK
BRN
SWITCH BOARD
CN003
2PIN CONNECTOR
FOCUS MOTOR

Fig. 3-6-15

- Replace the shield plate of backfocus adjust ring, then attach it to the chassis with two screws and solder the two points.

  Note : Turn OFF the power switch on the power supply unit whenever remove or replace the shield plate.

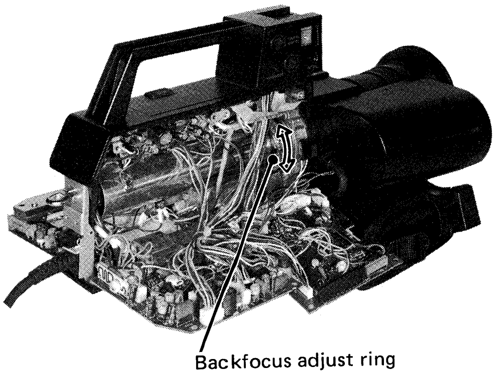
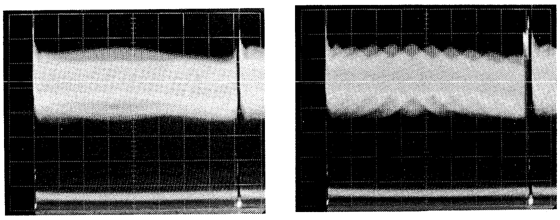


Fig. 4-2-4

(8) Vertical size and vertical centring adjustment

Test point :	TP1 (PREAMP OUT)	Process board
Adjusts :	VR5 (V.SIZE)	Deflection board
	VR6 (V.CENT)	Deflection board

- Aim the camera at the white chart.
- Connect the oscilloscope to PREAMP OUT TP1.
- Trigger the oscilloscope at V.rate. (Use Vs TP8 on process board.)
- Adjust V. SIZE VR5 for minimum beat during the vertical period. (Fig. 4-2-5)

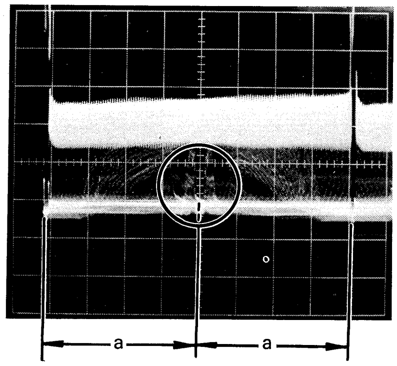


GOOD
0.1V/DIV, 2 msec/DIV

NO GOOD
0.1V/DIV, 2 msec/DIV

Fig. 4-2-5

- Turn H.CENT VR4 on deflection board fully counterclockwise.
- Turn H.SIZE VR2 on deflection board fully clockwise. The optical black and arrow maker appear on the oscilloscope.
- While observing the waveform, adjust V.CENT VR6 so that the marker which shows the vertical centre of pick-up tube positions at the centre of video signal waveform in vertical rate. (Fig. 4-2-6)



0.2V/DIV, 2msec/DIV

Fig. 4-2-6

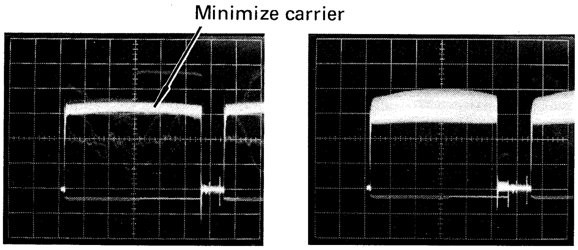
Note : When adjust the vertical centring using with the underscanning monitor, adjust V.CENT VR6 so that the arrow marker shows the vertical centre of the monitor.

- Turn back H.SIZE VR2 to its mechanical centre and H.CENT VR4 until the optical black and arrow marker disappear.

(9) Horizontal size and horizontal linearity adjustment

Test point :	TP3 (YH)	Process board
Adjusts :	VR2 (H.SIZE)	Deflection board
	VR3 (H.LIN-2)	Deflection board
	VL5 (H.LIN-1)	Deflection board

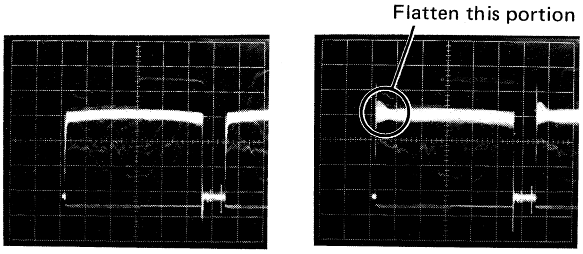
- Aim the camera at white chart.
- Connect the oscilloscope to YH TP3.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board)
- Adjust H.SIZE VR2 so that the carrier (5.0MHz) on the centre portion of the YH signal at YH TP3 is minimum. (Fig. 4-2-7)
- Adjust H.LIN-2 VR3 so that the starting portion of YH signal at YH TP3 is flat. (Fig. 4-2-8)
- Adjust H.LIN-1 VL5 so that the carrier (5.0MHz) on the YH signal is minimum.
- Repeat adjusting H.SIZE VR2, H.LIN-2 VR3 and H.LIN-1 VL5 until the carrier on the YH signal is minimum, the starting portion of YH signal is flat and picture has minimum disturbance on the left side.



GOOD
0.1V/DIV, 10μsec/DIV

NO GOOD
0.1V/DIV, 10μsec/DIV

Fig. 4-2-7



GOOD
0.1V/DIV, 10μsec/DIV

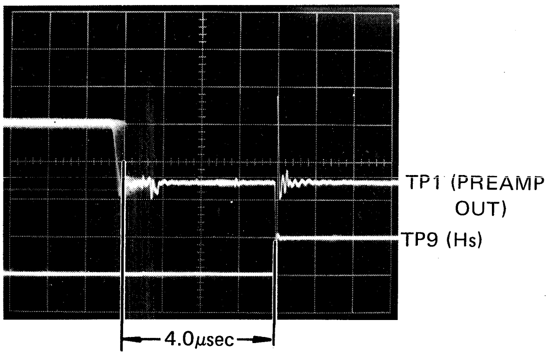
NO GOOD
0.1V/DIV, 10μsec/DIV

Fig. 4-2-8

(10) Horizontal centring adjustment

Test points :	TP1 (PREAMP OUT)	Process board
	TP9 (Hs)	Process board
Adjust :	VR4 (H.CENT)	Deflection board

- Aim the camera at the white chart.
- Connect the oscilloscope to PREAMP OUT TP1 and Hs TP9.
- Trigger the oscilloscope at H.rate. (Use Hs TP2 on deflection board.)
- Expand the horizontal blanking period on the oscilloscope.
- Adjust H.CENT VR4 until the optical black width is 4.0 μsec ±0.1 μsec. (Fig. 4-2-9) If the falling edge of the waveform corresponding to the picture is noisy, adjust for the middle.



1μsec/DIV

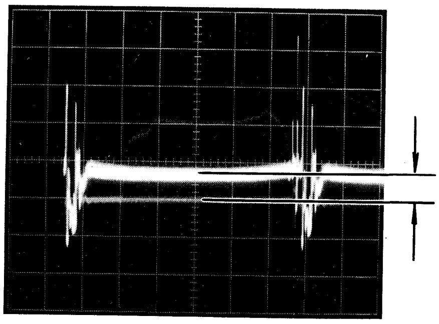
Fig. 4-2-9

(11) Bias light adjustment

Test point :	TP1 (PREAMP OUT)	Process board
Adjust :	VR13 (BIAS LIGHT)	Deflection board

- Cap on the lens.
- Connect the oscilloscope to PREAMP OUT TP1.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board.)
- Adjust BIAS LIGHT VR13 so that the bias current is 40mV ±10mV. (Fig. 4-2-10)

Note : If there is bias light (current) shading, adjust the level at the centre of the waveform.



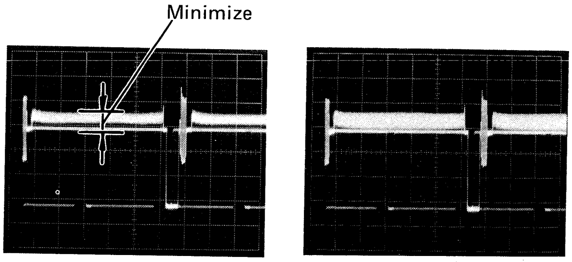
50mV/DIV, 10μsec/DIV

Fig. 4-2-10

(12) Bias light shading (Bs) correction adjustment

Test point :	TP5 (VIDEO)	Process board
Adjusts :	VR9 (Bs V.SAW)	Deflection board
	VR8 (Bs V.PARA)	Deflection board
	VR7 (Y PED)	Deflection board

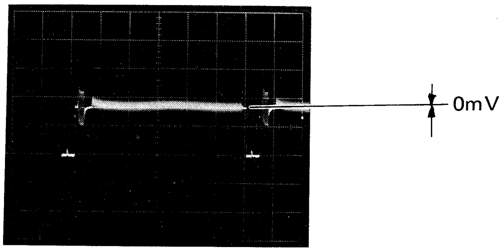
- Set the AGC switch on the right side of the grip arm to ON position.
- Cap on the lens.
- Connect the oscilloscope to VIDEO TP5.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board.)
- Turn Y PED VR7 fully clockwise.
- Adjust Bs V.PARA VR8 and Bs V.SAW VR9 so that the top portion of dark signal waveform becomes as narrow as possible. (Fig. 4-2-11)



GOOD
0.1V/DIV, 10μsec/DIV

NO GOOD
0.1V/DIV, 10μsec/DIV

Fig. 4-2-11



50mV/DIV, 10μsec/DIV

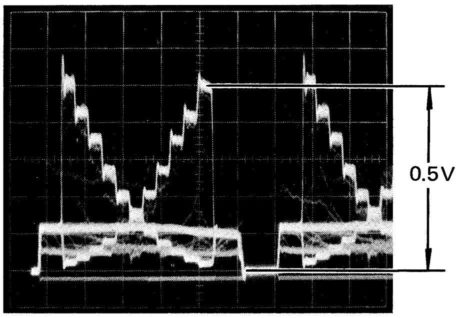
Fig. 4-2-12

- Adjust Y PED VR7 so that the pedestal level at VIDEO TP5 becomes $0^{+10\mathrm{mV}}_{-0\mathrm{mV}}$ (Fig. 4-2-12)
- Confirm that the pedestal level does not change by operating AGC switch ON/OFF. If changed, readjust Y PED VR7 so that the pedestal level does not change by operating AGC switch ON/OFF.

(13) AIC level adjustment

Test point :	TP2 (TRACKING)	Process board
Adjust :	VR3 (AIC SET)	Process board

- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TRACKING TP2.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board.)
- Adjust AIC SET VR3 so that the waveform is 0.5V ± 0.02V from the blanking level to the top step of the gray scale waveform. (Fig. 4-2-13)



0.1V/DIV, 10μsec/DIV

Fig. 4-2-13

(14) AGC/MANUAL gain adjustment

Test point :	TP3 (Y_H)	Process board
Adjusts :	VR1 (MANUAL GAIN)	Process board
	VR2 (AGC SET)	Process board

- Aim the camera at the gray scale chart.
- Set the AGC switch to ON position.
- Connect the oscilloscope to Y_H TP3.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board.)
- Adjust AGC SET VR2 for 0.4V ± 0.02V from the blanking level to the top step of the gray scale waveform. (Fig. 4-2-14)
- Change the AGC switch to OFF position.
- Adjust MANUAL GAIN VR1 for 0.4V ±0.02V from the blanking level to the top step of the gray scale waveform. (Fig. 4-2-14)
- Confirm that the waveform does not change by operating AGC switch ON/OFF. If change readjust MANUAL GAIN VR1 and AGC SET VR2 so that the waveform does not change by operating AGC switch ON/OFF and its level is 0.4V ± 0.02V.

Steps denoted by shaded outlines do not have to be performed if only pick-up tube is replaced.

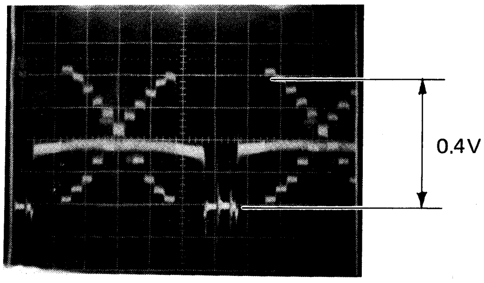
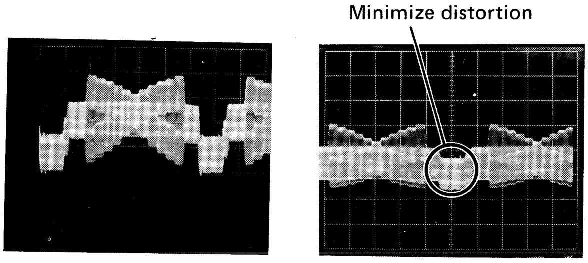


Fig. 4-2-14

(15) Vertical edge balance and vertical edge bias adjustment

Test points :	TP4 (V EDGE)	Process board
	TP11 (1H VIDEO)	Process board
Adjusts :	VR16 (V.EDGE BIAS)	Process board
	VR18 (V.EDGE BALANCE)	Process board

- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to 1H VIDEO TP11.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board.)
- Turn V.EDGE BIAS VR16 fully counterclockwise.
- Turn back V.EDGE BIAS VR16 slowly and stop it at the point where the distortion of the H.BL signal becomes minimum. (Fig. 4-2-15)

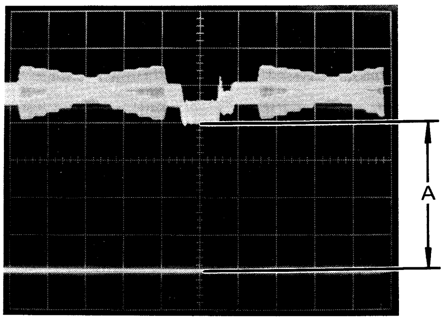


GOOD
0.2V/DIV, 10μsec/DIV

NO GOOD
0.2V/DIV, 10μsec/DIV

Fig. 4-2-15

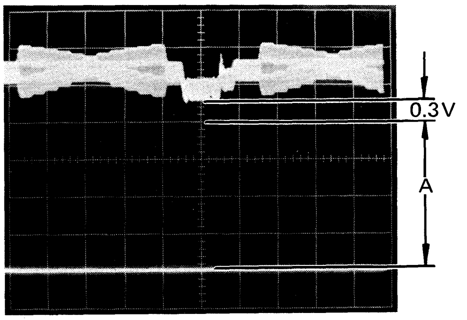
- Set the input coupling selector on the oscilloscope to DC position.
- Note the DC level of the H.BL portion as (A). (Fig. 4-2-16)



0.5V/DIV, 10μsec/DIV

Fig. 4-2-16

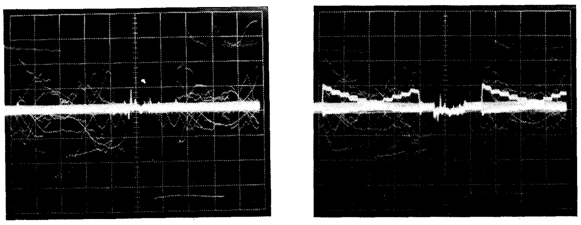
- Adjust V.EDGE BIAS VR16 so that the H.BL DC level becomes (A) +0.3V. (Fig.4-2-17)



0.5V/DIV, 10μsec/DIV

Fig. 4-2-17

- Reset the input coupling selector on the oscilloscope to AC position.
- Connect the oscilloscope to V.EDGE TP4.
- Adjust V.EDGE BALANCE VR18 to cancel the video signal. (Fig. 4-2-18)



GOOD 0.2V/DIV, 10μsec/DIV

NO GOOD 0.2V/DIV, 10μsec/DIV

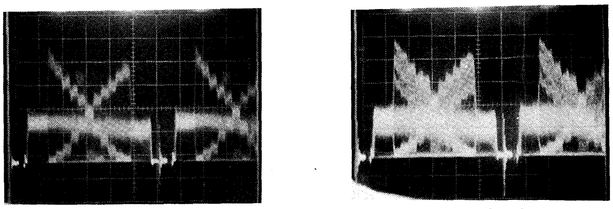
Fig. 4-2-18

(16) R and B signal separation adjustment

Test points :	Pin 3 of CN1 (B-YL)	Process board
Adjusts :	CT2 (R/B SEPARATION-1)	Process board
	VR5 (R/B SEPARATION-2)	Process board

- Set the YL ON/OFF switch (SW1) on process board to OFF position.
- Aim the camera at the logarithmic gray scale chart.
- Connect oscilloscope to pin 3 of CN1.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board.)
- Adjust R/B SEPARATION-1 CT2 for minimum waveform flicker. (Fig. 4-2-19)
- Adjust R/B SEPARATION-2 VR5 for the same condition.
- Repeat adjusting R/B SEPARATION-1 CT2 and R/B SEPARATION-2 VR5 until the flicker in waveform is minimum.

Steps denoted by shaded outlines do not have to be performed if only pick-up tube is replaced.



GOOD 0.1V/DIV, 10μsec/DIV

NO GOOD 0.1V/DIV, 10μsec/DIV

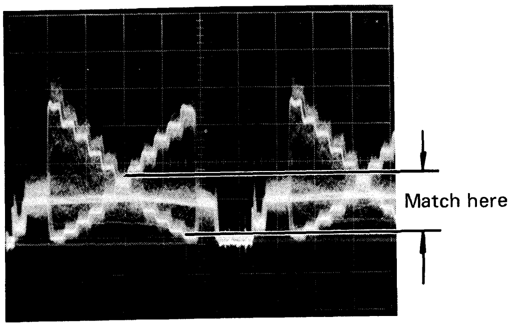
Fig. 4-2-19

(17) B gain and YL pedestal preset adjustment

Test points :	Pin 3 of CN1 (B-YL)	Process board
	Pin 2 of CN1 (YL)	Process board
Adjusts :	VR4 (R/B GAIN)	Process board
	VR15 (YL PED)	Process board

- Set the YL ON/OFF switch to OFF position.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to pin 2 and pin 3 of CN1.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board.)
- Set the colour balance control on right bottom cover to centre (click) position.
- Turn B TRACKING-1 VR7, B TRACKING-2 VR6, B TRACKING-3 VR8, R TRACKING-1 VR10, R TRACKING-2 VR11 and R TRACKING-3 VR9 on process board to their mechanical centre.

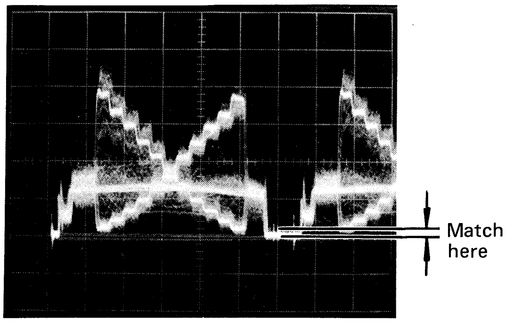
  Note : Before adjusting R/B GAIN VR4, if the gray scales black chip of YL signal is suppressed, turn YL PED VR15 until the black chip of YL signal can be observed.
- Overlay the R signal and YL signal on the oscilloscope, and adjust R/B GAIN VR4 so that the signal level between the black chip (zero step) and fifth step (crossing step) of gray scale waveform match. (Fig. 4-2-20)



0.1V/DIV, 10μsec/DIV

Fig. 4-2-20

- Next adjust YL PED VR15 so that the pedestal level of YL signal matches that of B signal. (Fig. 4-2-21)



0.1V/DIV, 10μsec/DIV

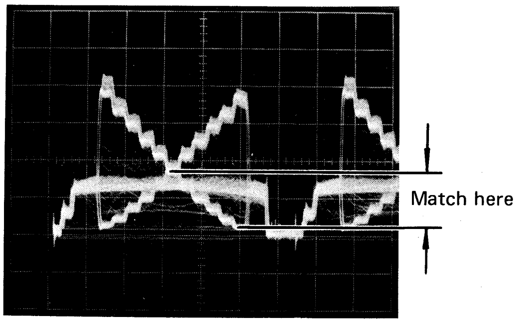
Fig. 4-2-21

(18) R gain and R pedestal preset adjustment

Test points :	Pin 1 of CN1 (R-YL)	Process board
	Pin 2 of CN1 (YL)	Process board
Adjusts :	VR12 (R GAIN)	Process board
	VR13 (R PED)	Process board

- Set the YL ON/OFF switch to OFF position.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to Pin 1 and Pin 2 of CN1.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board.)

  Note : Before adjusting R GAIN VR12, if the gray scales black chip of R signal is suppressed, turn R PED VR13 until the black chip of R signal can be observed.
- Overlay the B signal and YL signal on the oscilloscope, and adjust R/B GAIN VR4 so that the signal level between the black chip (zero step) and fifth step (crossing step) of gray scale waveform match. (Fig. 4-2-22)

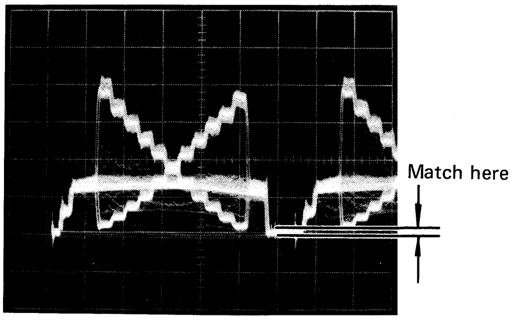


0.1V/DIV, 10μsec/DIV

Fig. 4-2-22

Steps denoted by shaded outlines do not have to be performed if only pick-up tube is replaced.

- Next adjust R PED VR13 so that the pedestal level of R signal matches that of YL signal. (Fig. 4-2-23)



0.1V/DIV, 10μsec/DIV

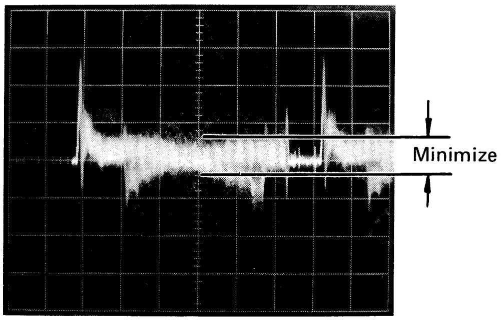
Fig. 4-2-23

- Repeat adjusting R GAIN VR12 and R PED VR13 until the signal level between the black chip (zero step) and fifth step (crossing step), and pedestal level of gray scale waveform match.

(19) YL and B signal tracking adjustment

Test point :	Pin 3 of CN1 (B-YL)	Process board
Adjusts :	VR7 (B TRACKING-1)	Process board
	VR6 (B TRACKING-2)	Process board
	VR8 (B TRACKING-3)	Process board
	VR4 (R/B GAIN)	Process board

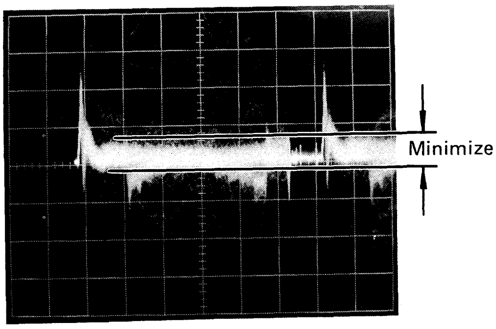
- Set the YL ON/OFF switch to ON position.
- Confirm that the B TRACKING-1 VR7, B TRACKING-2 VR6 and B TRACKING-3 VR8 are set to their mechanical centre.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to Pin 3 of CN1.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board.)
- Confirm that the centre portion of B-YL signal is minimum. If not adjust R/B GAIN VR4 on process board to minimize. (Fig. 4-2-24)



0.1V/DIV, 10μsec/DIV

Fig. 4-2-24

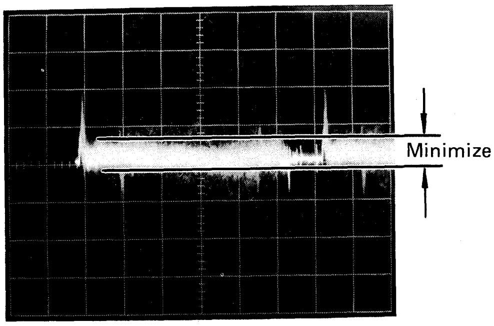
- Adjust B TRACKING-1 VR7 so that the B-YL signal becomes minimum. (Fig. 4-2-25)



0.1V/DIV, 10μsec/DIV

Fig. 4-2-25

- Adjust B TRACKING-2 VR6 and B TRACKING-3 VR8 so that the B-YL signal becomes minimum. (Fig. 4-2-26)



0.1V/DIV, 10μsec/DIV

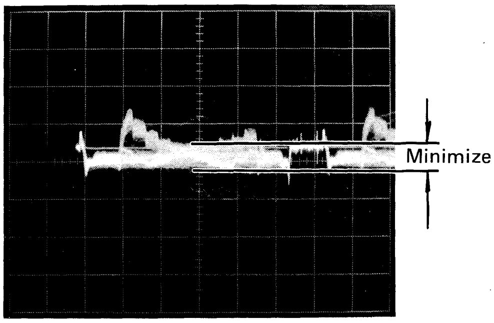
Fig. 4-2-26

- Repeat these steps until the B-YL signal becomes minimum.

(20) YL and R signal tracking adjustment

Test point :	Pin 1 of CN1 (R-YL)	Process board
Adjusts :	VR10 (R TRACKING-1)	Process board
	VR11 (R TRACKING-2)	Process board
	VR9 (R TRACKING-3)	Process board
	VR12 (R GAIN)	Process board

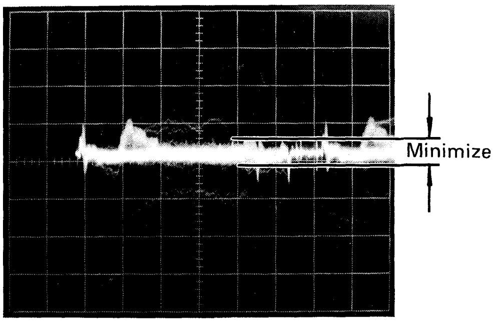
- Set the YL ON/OFF switch to ON position.
- Confirm that the R TRACKING-1 VR10, R TRACKING-2 VR11 and R TRACKING-3 VR9 are set to their mechanical centre.
- Aim the camera at logarithmic gray scale chart.
- Connect the oscilloscope Pin 1 of CN1.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board.)
- Confirm that the centre portion of R-YL signal is minimum. If not, adjust R GAIN VR12 on process board to minimize. (Fig. 4-2-27)



0.1V/DIV, 10μsec/DIV

Fig. 4-2-27

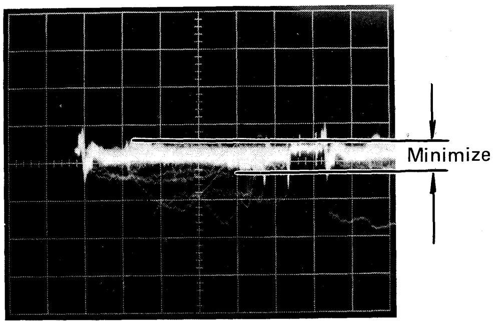
- Adjust R TRACKING-1 VR10 so that R-YL signal becomes minimum. (Fig. 4-2-28)



0.1V/DIV, 10μsec/DIV

Fig. 4-2-28

- Adjust R TRACKING-2 VR11 and R TRACKING-3 VR9 so that the R-YL signal becomes minimum. (Fig. 4-2-29)



0.1V/DIV, 10μsec/DIV

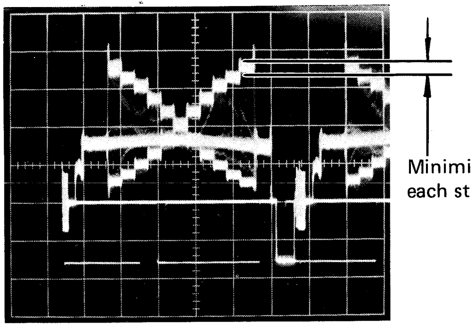
Fig. 4-2-29

- Repeat these steps until the R-YL signal becomes minimum.

(21) YL and R/B signal tracking fine adjustment

Test point :	TP5 (VIDEO)	Process	board
Adjusts :	VR4 (R/B GAIN)	Process	board
	VR12 (R GAIN)	Process	board
	VR7 (B TRACKING-1)	Process	board
	VR6 (B TRACKING-2)	Process	board
	VR8 (B TRACKING-3)	Process	board
	VR10 (R TRACKING-1)	Process	board
	VR11 (R TRACKING-2)	Process	board
	VR9 (R TRACKING-3)	Process	board

- Set the YL ON/OFF switch to ON position.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to VIDEO TP5.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board.)
- Fine adjust R/B GAIN VR4 so that the carrier on the fifth step (crossing step) at VIDEO TP5 becomes minimum.
- Fine adjust R GAIN VR12 for the same condition.
- Fine adjust B TRACKING-1 VR7 and R TRACKING-1 VR10 so that the carrier on the second and third steps at VIDEO TP5 becomes minimum.
- Fine adjust B TRACKING-2 VR6, R TRACKING-2 VR11, B TRACKING-3 VR8 and R TRACKING-3 so that the carrier on the eighth to tenth steps becomes minimum. (Fig. 4-2-30)



0.2V/DIV, 10μsec/DIV

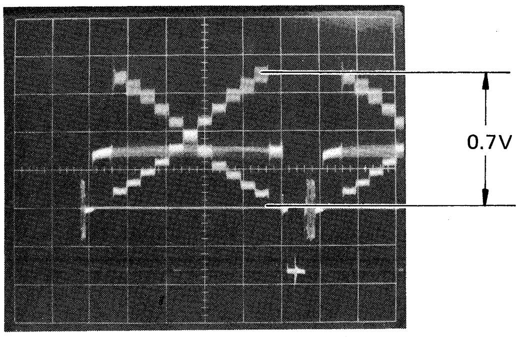
Fig. 4-2-30

(22) Y gain adjustment

Test point :	TP5 (VIDEO)	Process	board
Adjust :	VR14 (Y GAIN)	Process	board

- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to VIDEO TP5.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board.)
- Adjust Y GAIN VR14 for 0.7V ± 0.05V from blanking level to the top step of the gray scale waveform. (Fig. 4-2-31)

Steps denoted by shaded outlines do not have to be performed if only pick-up tube is replaced.



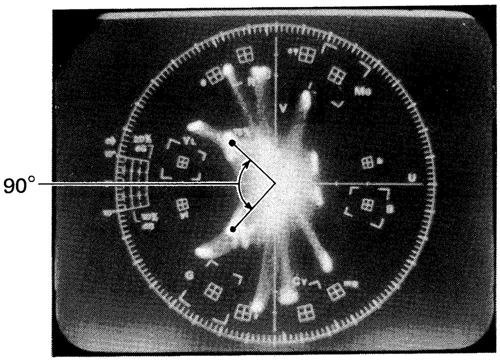
0.2V/DIV, 10μsec/DIV

Fig. 4-2-31

(23) Chroma and Burst adjustment

Test point :	TP5 (VIDEO)	Process	board
Adjusts :	VR22 (BURST GAIN)	Process	board
	VR23 (BURST PHASE)	Process	board
	CT4 (CHROMA PHASE)	Process	board
	VR21 (CHROMA GAIN)	Process	board
	VR20 (CHROMA CLIP)	Process	board
Observe :	Vectorscope		

- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to VIDEO TP5.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board.)
- Connect the video output to a terminated vectorscope.
- Set the YL ON/OFF switch to ON position.
- Adjust BURST PHASE VR23 so that the phase between two bursts becomes 90° each other on the vectorscope. (Fig. 4-2-32)



Flg. 4-2-32

Fig. 4-2-32

- Set the vectorscope to NTSC mode.
- Make sure that the burst vector becomes 135° on the vectorscope. (Fig. 2-4-33)

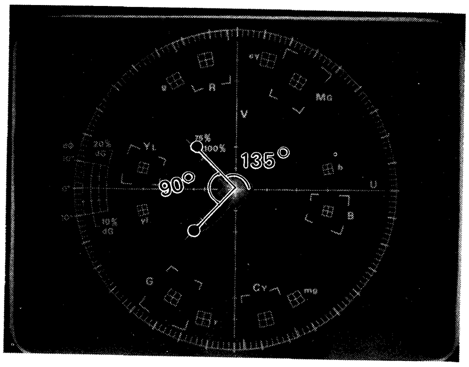
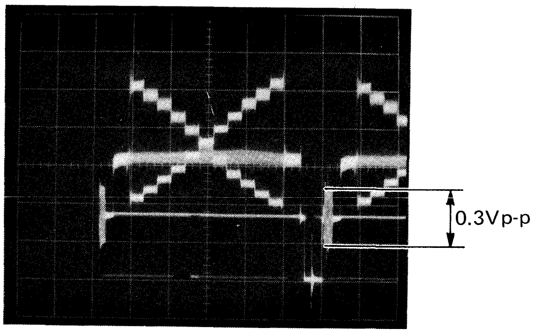


Fig. 4-2-33

- Adjust BURST GAIN VR22 so that the burst level is 0.3V ± 0.01V on the oscilloscope. (Fig. 4-2-34)
- Adjust BURST GAIN VR22 so that the burst level becomes 75% on the vectorscope. (Fig. 4-2-35)
- Adjust CHROMA PHASE CT4 so that the two red vectors become one above another on the vectorscope.
- Turn CHROMA CLIP VR20 fully counterclockwise.
- Adjust CHROMA GAIN VR21 so that the red vector becomes 185% as compares to the burst signal on the vectorscope. (Fig. 4-2-35)



0.2V/DIV, 10μsec/DIV

Fig. 4-2-34

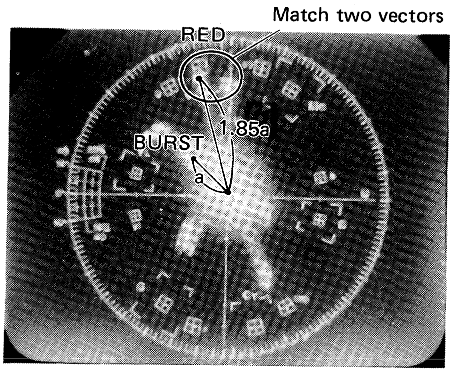


Fig. 4-2-35

Steps denoted by shaded outlines do not have to be performed if only pick-up tube is replaced.

- Turn the colour balance control to the R position.
- Adjust CHROMA CLIP VR20 so that the red vector clips at 225% ± 10% as compares to the burst signal on the vectorscope. (Fig. 4-2-36)

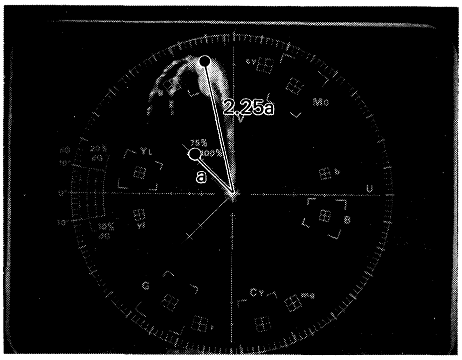


Fig. 4-2-36

- Reset the colour balance control to the centre position.

(24) YL phase adjustment

Adjust : CT3 (YL PHASE) Process board
Observe : Colour monitor

- Aim the camera at white set chart. (The reverse side of ball chart.)
- Adjust YL PHASE CT3 for minimum colour on the right side edge of white portion. (Fig. 4-2-37)

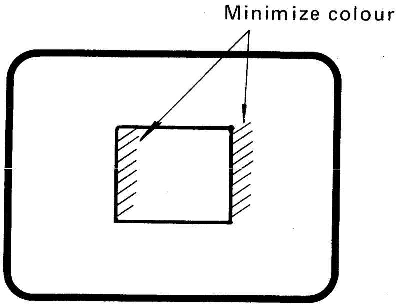


Fig. 4-2-37

(25) Title colour phase adjustment

Adjust :	CT1 (TITLE COLOUR PHASE)	Process board
Observe :	Colour monitor Vectorscope	

- Connect the video output to a terminated vectorscope.
- Press the TITLE button on the key board (B) to observe the dots on the monitor screen.
- Repeat to press the TITLE CLR button on the key board (B) until title colour character becomes RED on the EVF screen.
- Press the KEY button on the key board (B) for red key picture on the monitor screen.
- Adjust TITLE COLOUR PHASE CT1 so that the two red vectors become one above another on the vectorscope (Fig. 4-2-38)

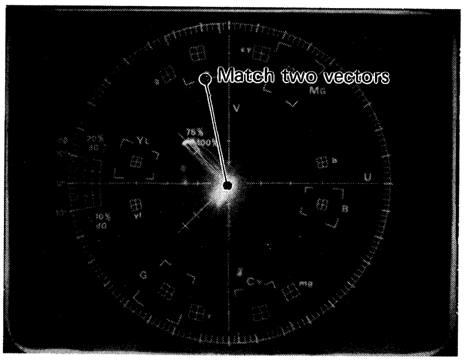


Fig. 4-2-38

(26) Character size adjustment

Adjust :	VR1 (CHARACTER SIZE)	Micro processor board
Observe :	Colour monitor	

- Press the TITLE button to observe the dot on the monitor screen.
- Press the WORD L/S button on the key board (B) to select small dots.
- Adjust CHARACTER SIZE VR1 so that the both side spaces between dots and screen edges become equal (A). (Fig. 4-2-39)

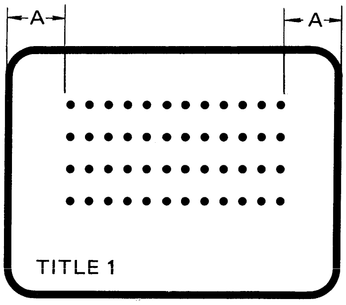


Fig. 4-2-39

Steps denoted by shaded outlines do not have to be performed if only pick-up tube is replaced.

(27) Timer frequency adjustment

Test point :	TP1 (TIMER FREQ)	Microprocessor board
Adjust :	CT1 (TIMER FREQ)	Microprocessor board

- Insert the specified battery (SUM-3, AM-3 or AA size) into backup battery compartment.
- Turn OFF the power.
- Connect the frequency counter to TIMER FREQ TP1 on Micro processor board.
- Adjust TIMER FREQ CT1 so that the frequency at TIMER FREQ TP1 is 32,768.00(Hz).

4-3 Viewfinder adjustment

- The camera must be completely aligned before viewfinder adjustment is made.
- The conditions and connections for viewfinder adjustment are the same as shown in Fig. 4-1-1 on page 12.
- Refer to page 26 for the adjusting controls and test points.

(1) Picture tilt adjustment

Adjust :	Deflection coil
Observe :	Viewfinder

- Reduce picture size using EVF V.SIZE VR11 on deflection board and H.SIZE VL3 on EVF board.
- Loosen the deflection coil holding screw. (Fig. 4-3-1)

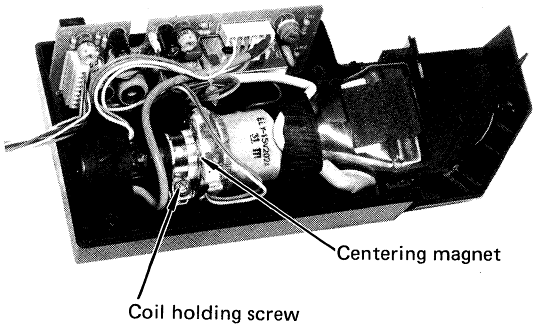


Fig. 4-3-1

- Cap on the lens.
- Observe the viewfinder, and turn the deflection coil until the raster is straight.
- Tighten the deflection coil holding screw.

(2) Centring magnets adjustment

Adjust : Centring magnet
Observe : Viewfinder

- Aim the camera at the ball chart.
- Adjust the centring magnets (See Fig. 4-3-1) until the centre of picture (raster) becomes to the centre of the viewfinder screen. (Fig. 4-3-2)

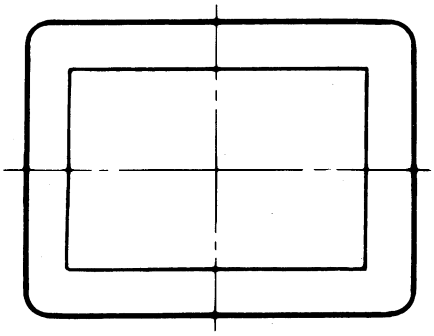


Fig. 4-3-2

(3) EVF V.SIZE and H.SIZE adjustment

Adjusts :	VR11 (EVF V.SIZE)	Deflection board
	VL3 (H.SIZE)	EVF board
Observe :	Viewfinder	

- Aim the camera at the ball chart, and line up the reference arrow head with edge of the raster (blanking) on the viewfinder. (Fig. 4-3-3)
- Adjust H.SIZE VL3 to a point where the ball charts edges just disappear on the viewfinder. (Fig. 4-3-3)
- Then adjust EVF V.SIZE VR11 so that the circle in the chart is nearly a true circle.

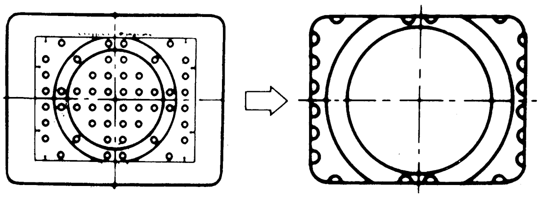


Fig. 4-3-3

Steps denoted by shaded outlines do not have to be performed if only pick-up tube is replaced.

(4) Contrast and brightness adjustment

Adjusts :	VR2 (BRIGHT)	EVF board
	VR3 (CONTRAST)	EVF board
Observe :	Viewfinder	

- Aim the camera at the rogarithmic gray scale chart.
- Adjust BRIGHT VR2 and CONTRAST VR3 so that the black and white chip gradations will be the same on the viewfinder screen as that in the monitor.

(5) Focus adjustment

Adjust :	VR1 (FOCUS)	EVF board
Observe :	Viewfinder	

- Aim the camera at ball chart.
- Adjust FOCUS VR1 for best resolution in the viewfinder.

Steps denoted by shaded outlines do not have to be performed if only pick-up tube is replaced.

4-4 Auto Focus Lens Adjustment

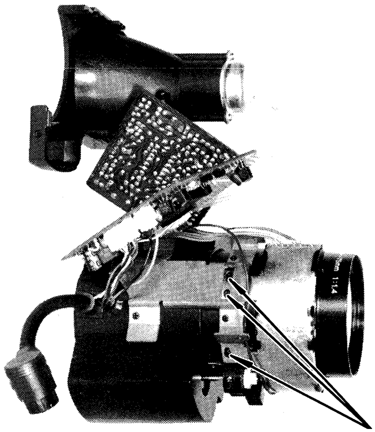
- Disassemble the lens as described in Section 2 DISASSEMBLY PROCEDURE FOR ADJUSTMENT on page 1.
- Connect the lens connector to the connector on the connector board of the camera.
- Adjust the auto focus lens using with completely adjusted camera.
- Refer to page 28 for the adjusting controls and test points.

(1) Focus ring position sensor adjustment

Adjust : Position sensor
Observe : Pin 1 to Pin 7 of CN004

- Set Auto ON/OFF switch SW001 to OFF position.
- Turn the lens focus to minimum distance 3.8ft (1.3m) position.
- Loosen three screws holding lens position sensor and bring down the position sensor to lowest position. (Fig. 4-4-1)
- Bring up the position sensor slowly while observing each potential of CN004 and stop it at the point where the each potential at pin 1, pin 2, pin 3, pin 4, pin 5, pin 6 and pin 7 of CN004 are H, L, H, H, L, H and L respectively.
- Tighten three screws.

  Note : Do not loosen three screws holding position sensor, when adjusting only the electrical circuit of auto focus lens.



Loosen three screws when adjusting the lens position sensor

Fig. 4-4-1

(2) 63.8KHz adjustment

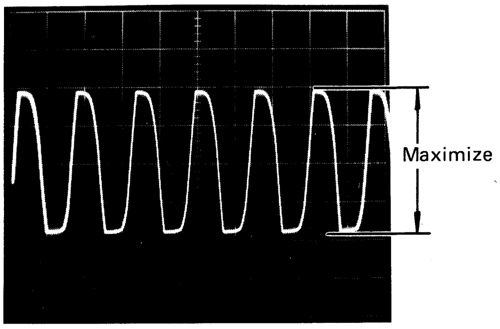
Test point : Base of Q005
Adjust : VR003 (63.8KHz ADJ)

- Set Auto ON/OFF switch to ON position.
- Connect jumper wire between base of Q009 and ground
- Connect the frequency counter to base of Q005.
- Adjust VR003 for 63.8kHz ± 0.2kHz.
- Disconnect jumper wire from base of Q009.

(3) 63.8KHz BPF adjustment

Test point : TP1
Adjust : T002 (63.8KHz BPF)

- Set Auto ON/OFF switch to ON position.
- Connect jumper wire between base of Q009 and ground.
- Connect jumper wire between base of Q004 and ground.
- Connect jumper wire between base of Q005 and pin 1 of CN001.
- Connect the oscilloscope to TP1.
- Adjust 63.8KHz BPF T002 for maximum output (Fig. 4-4-2)
- Disconnect the jumper wires.



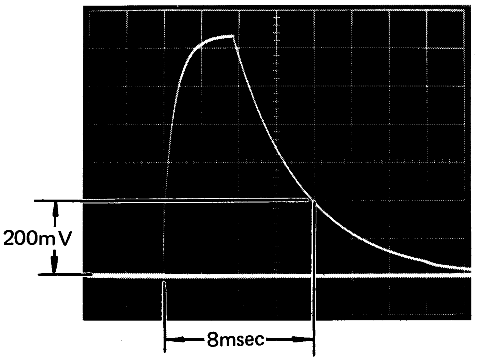
2V/DIV, 10μsec/DIV

Fig. 4-4-2

(4) REF. V.set adjustment

Test point : TP3
Adjust : VR002 (REF. V.SET)

- Set Auto ON/OFF switch to ON position.
- Connect the oscilloscope to TP3.
- Adjust REF. V.SET VR002 so that output voltage becomes 200mV after 8msec at 77°F from trigger point. (Fig. 4-4-3)
- Select timing (msec) which is shown at the vertical graduation through the temperature graduation and crosspoint in Fig. 4-4-4.



100mV/DIV, 2msec/DIV

Fig. 4-4-3

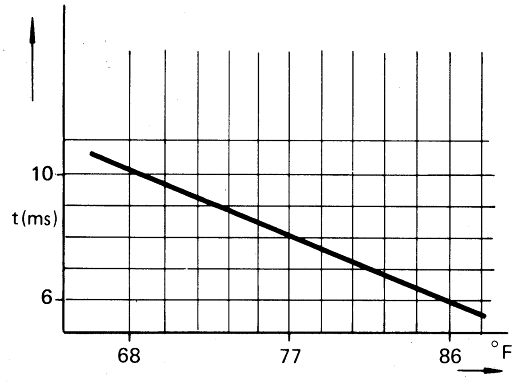


Fig. 4-4-4

(5) Gain adjustment

Test points : TP1
TP3
Adjust : VR001 (GAIN)

- Aim the camera at the white chart.
- Set distance between the object and camera to 2m.
- Set Auto ON/OFF switch to ON position.
- Connect the oscilloscope to TP1 and TP3.
- Adjust GAIN VR001 so that the receiving waveform at TP1 becomes 6.4 Vp-p. (Fig. 4-4-5)

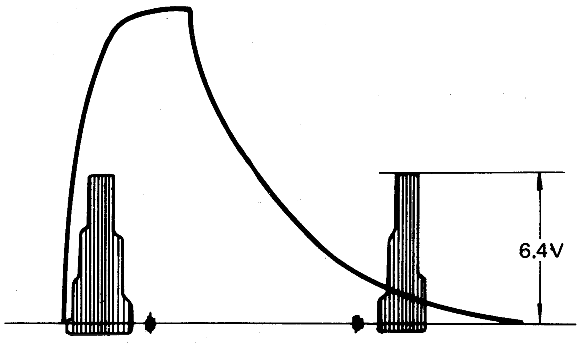


Fig. 4-4-5

Steps denoted by shaded outlines do not have to be performed if only pick-up tube is replaced.

(6) Thermal correct adjustment

Test points : Pin 9 of IC001
Pin 10 of IC001
Adjust : VR004 (THERMAL CORRECT)

- Connect oscilloscope to pin 9 and pin 10 of IC001.
- Adjust THERMAL CORRECT VR004 so that the term between rise timing of pin 10 and decay timing of pin 9 become 1.3msec at 68°F. (Fig. 4-4-6)
- Select the timing (msec) which is shown at the vertical graduation through the temperature graduation and crosspoint in Fig. 4-4-7.

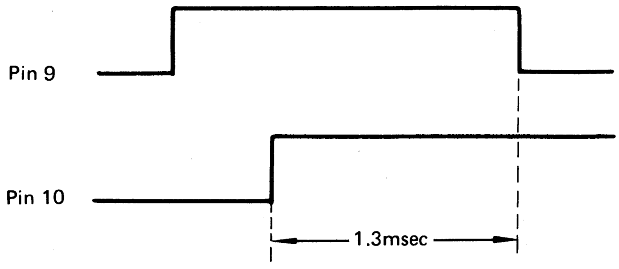


Fig. 4-4-6

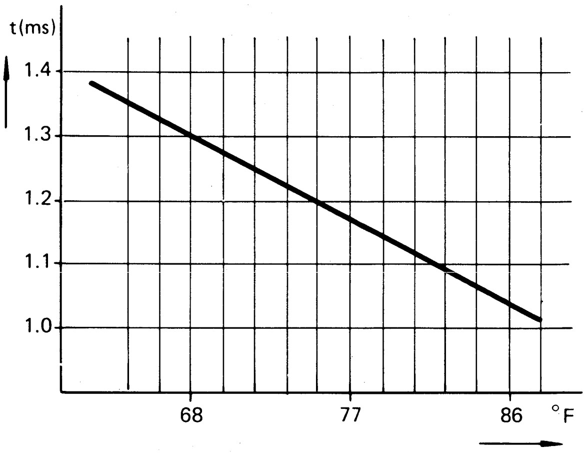
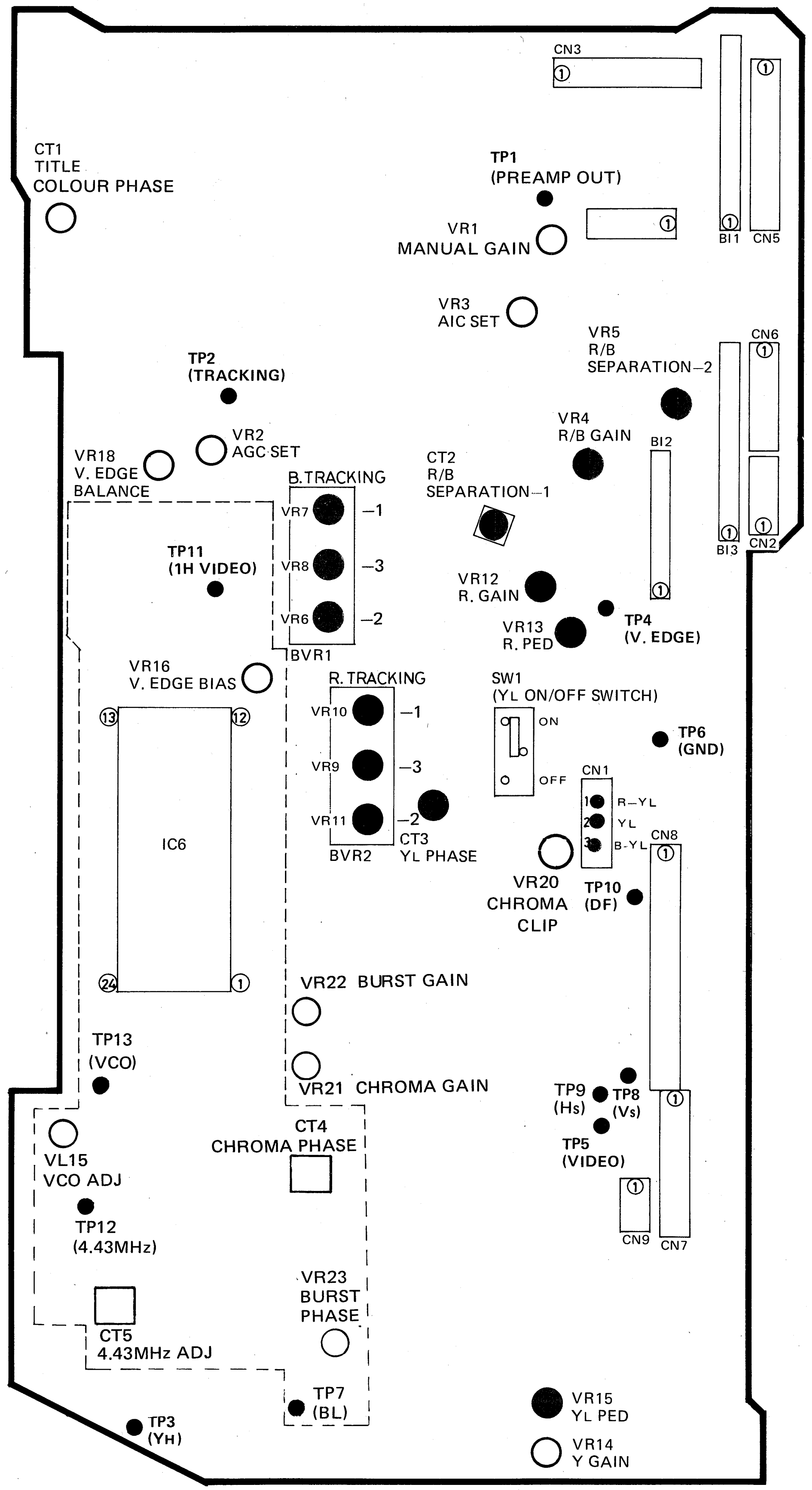
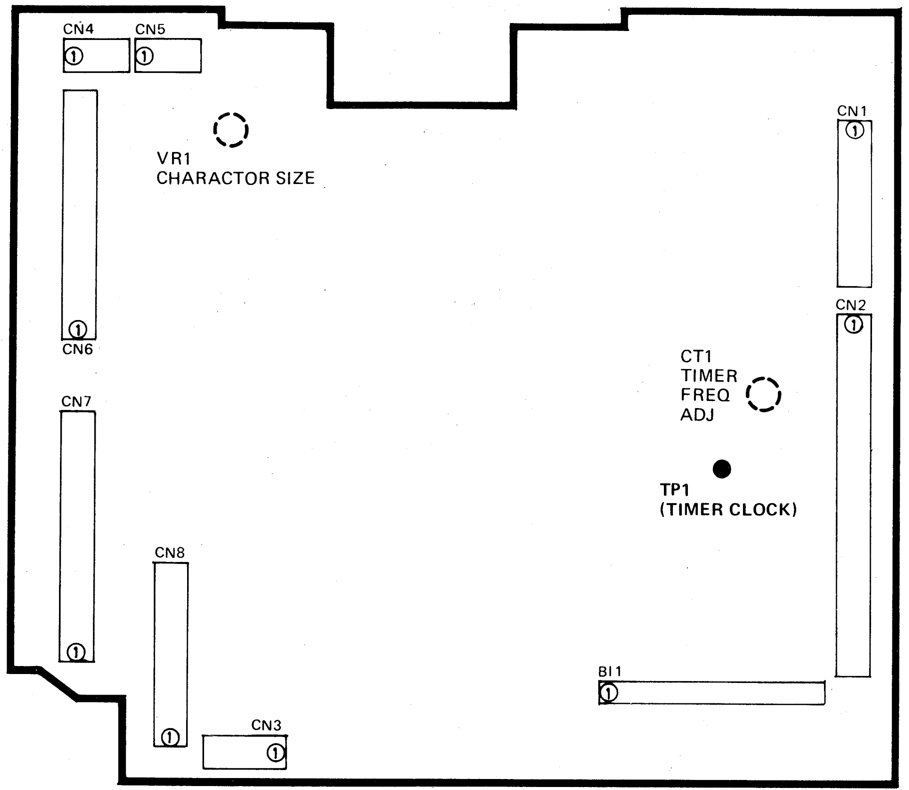


Fig. 4-4-7

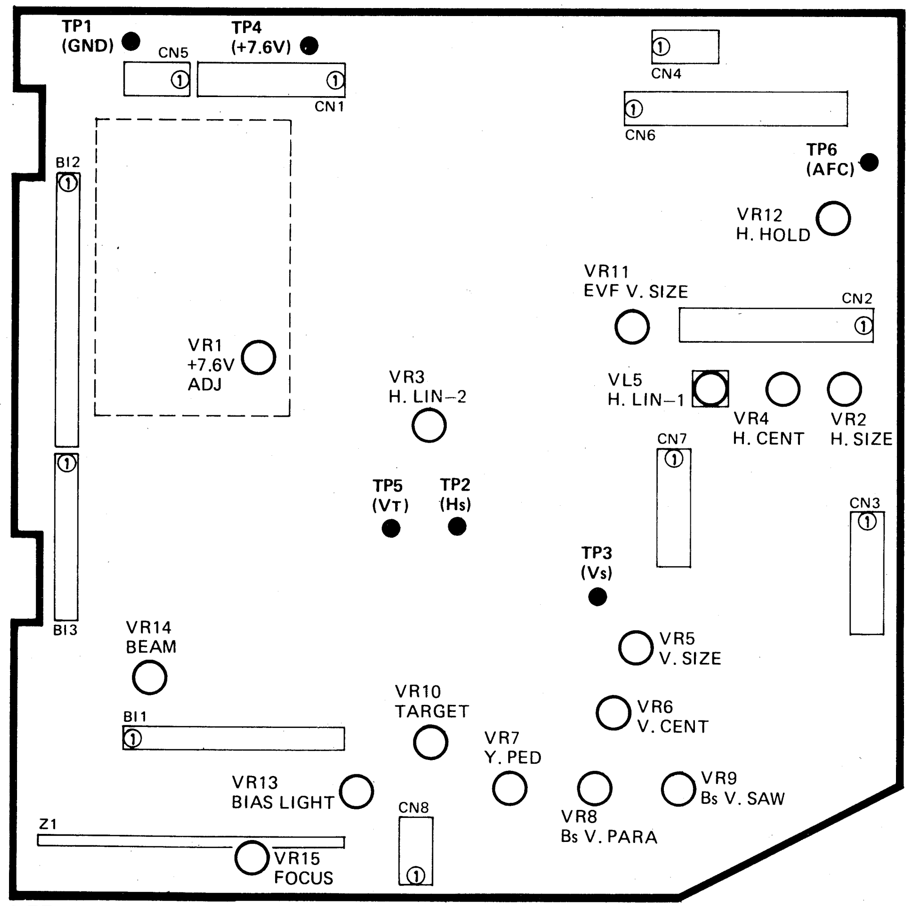
5. LOCATION OF TEST POINTS AND ADJUSTING CONTROLS


CN3
CT1
TITLE
COLOUR PHASE
TP1
(PREAMP OUT)
VR1
MANUAL GAIN
BI1
CN5
VR3
AIC SET
VR5
R/B
SEPARATION–2
CN6
TP2
(TRACKING)
VR4
R/B GAIN
VR2
AGC SET
VR18
V. EDGE
BALANCE
B.TRACKING
CT2
R/B
SEPARATION–1
BI2
VR7
–1
VR8
–3
VR6
–2
BVR1
TP11
(1H VIDEO)
VR12
R. GAIN
VR13
R. PED
TP4
(V. EDGE)
BI3
CN2
VR16
V. EDGE BIAS
R.TRACKING
VR10
–1
VR9
–3
VR11
–2
BVR2
CT3
YL PHASE
SW1
(YL ON/OFF SWITCH)
ON
OFF
TP6
(GND)
CN1
R–YL
YL
B–YL
CN8
IC6
VR20
CHROMA
CLIP
TP10
(DF)
VR22 BURST GAIN
VR21 CHROMA GAIN
TP13
(VCO)
TP9
(Hs)
TP8
(Vs)
TP5
(VIDEO)
VL15
VCO ADJ
CT4
CHROMA PHASE
TP12
(4.43MHz)
CN9
CN7
VR23
BURST
PHASE
CT5
4.43MHz ADJ
TP7
(BL)
TP3
(YH)
VR15
YL PED
VR14
Y GAIN

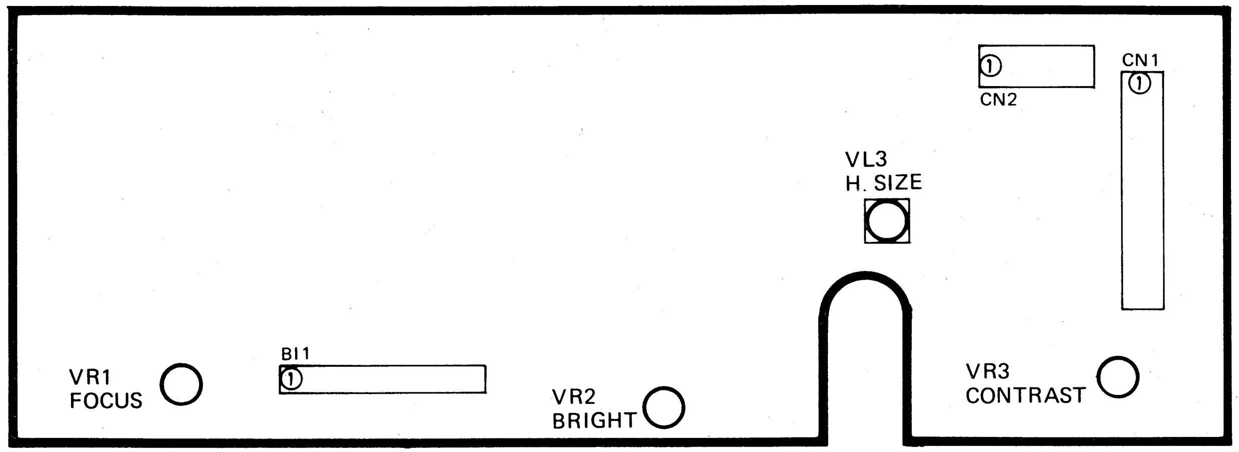
PROCESS BOARD
(YFVPKA2003EA)


CN4
CN5
VR1
CHARACTOR SIZE
CN1
CN6
CN2
CN7
CT1
TIMER
FREQ
ADJ
TP1
(TIMER CLOCK)
CN8
BI1
CN3

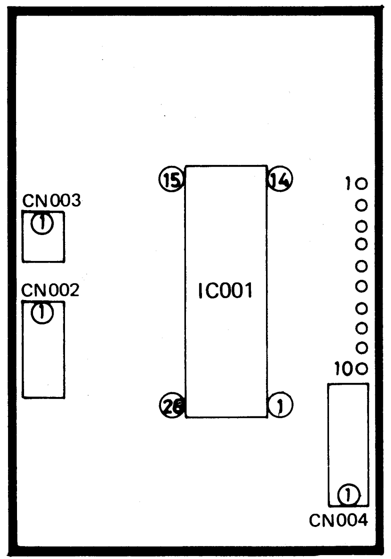
MICRO PROCESSOR BOARD
(YFVPKA2004EA)


TP1
(GND)
CN5
TP4
(+7.6V)
CN1
CN4
CN6
TP6
(AFC)
BI2
VR12
H. HOLD
VR11
EVF V. SIZE
CN2
VR1
+7.6V
ADJ
VR3
H. LIN–2
VL5
H. LIN–1
VR4
H. CENT
VR2
H. SIZE
CN7
TP5
(VT)
TP2
(Hs)
CN3
TP3
(Vs)
BI3
VR14
BEAM
VR5
V. SIZE
VR10
TARGET
VR6
V. CENT
BI1
VR7
Y. PED
VR13
BIAS LIGHT
CN8
VR8
Bs V. PARA
VR9
Bs V. SAW
Z1
VR15
FOCUS

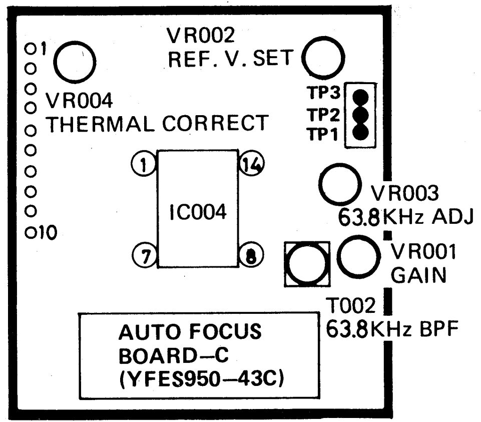
DEFLECTION BOARD
(YFVPKA2001EA)


CN2
CN1
①
①
VL3
H. SIZE
VR1
FOCUS
BI1
①
VR2
BRIGHT
VR3
CONTRAST

EVF BOARD
(YFVPKA0706JB)


CN003
①
CN002
①
⑮
⑭
IC001
⑳
①
1
10
100
①
CN004

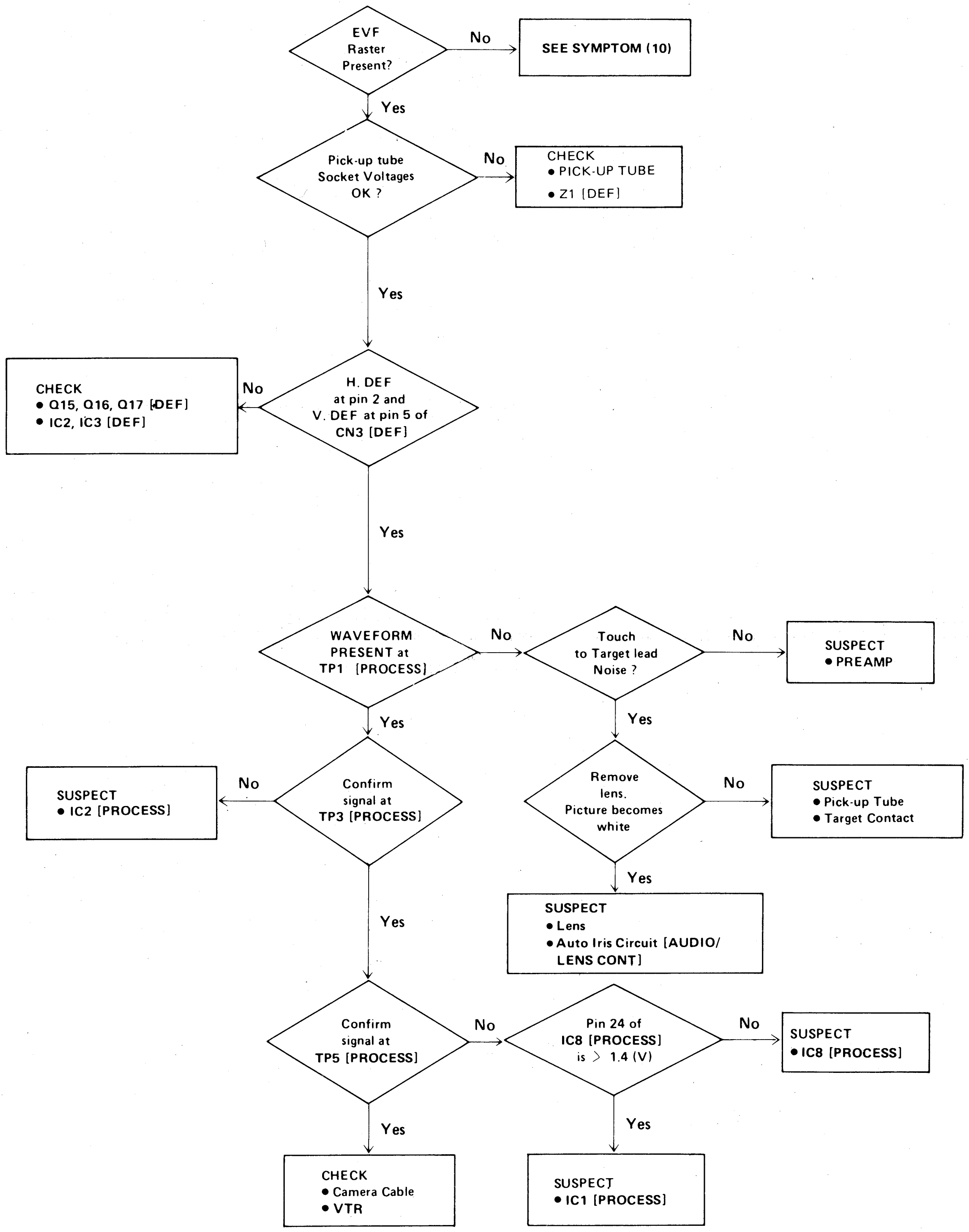
AUTO FOCUS BOARD–A
(YFES950–43A)


1
VR002
REF. V. SET
VR004
THERMAL CORRECT
TP3
TP2
TP1
①
⑭
IC004
⑦
⑧
10
VR003
63.8KHz ADJ
VR001
GAIN
T002
63.8KHz BPF
AUTO FOCUS
BOARD–C
(YFES950–43C)

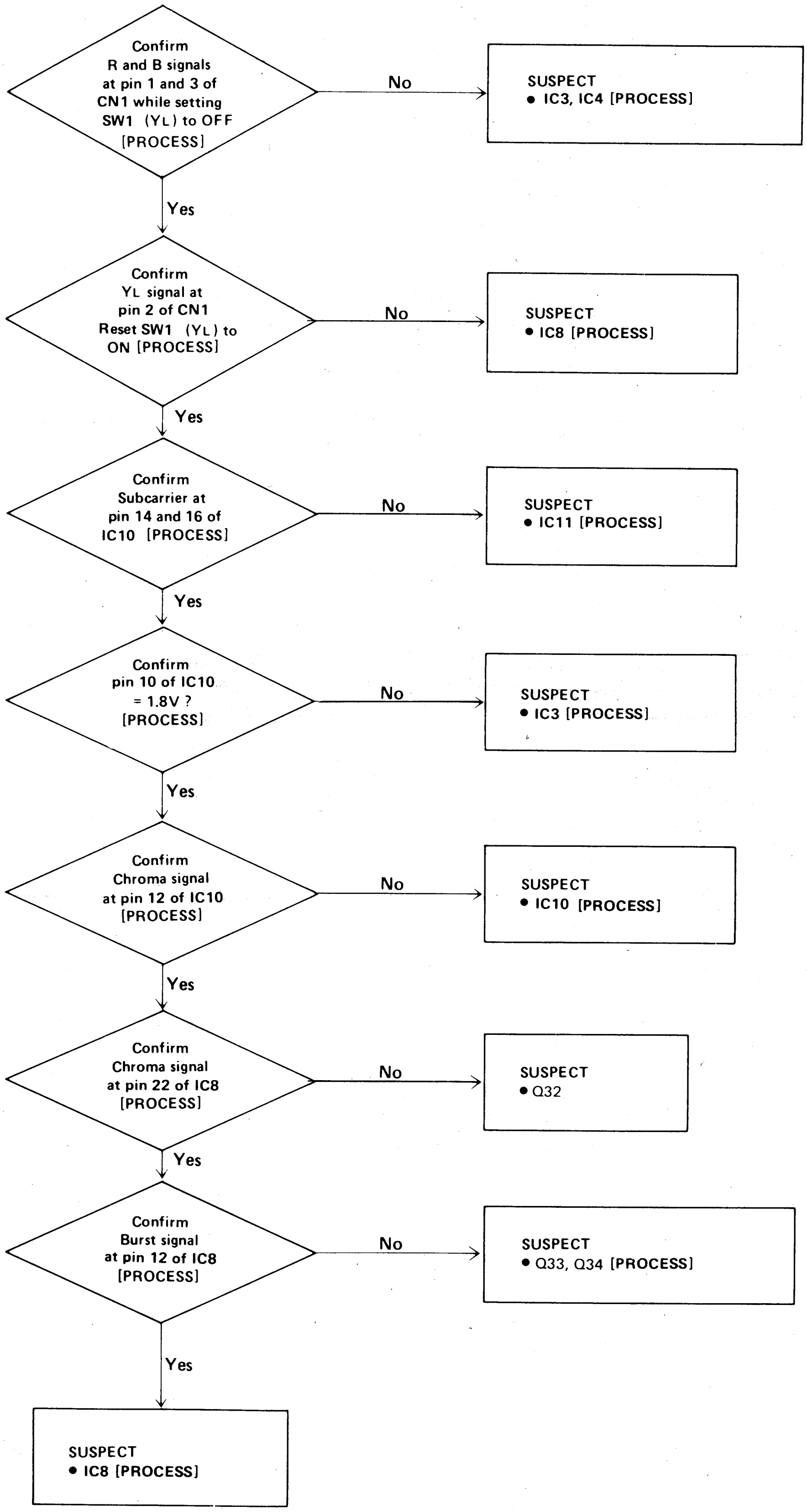
AUTO FOCUS BOARD–B
(YFES950–43B)

6. TROUBLESHOOTING GUIDE

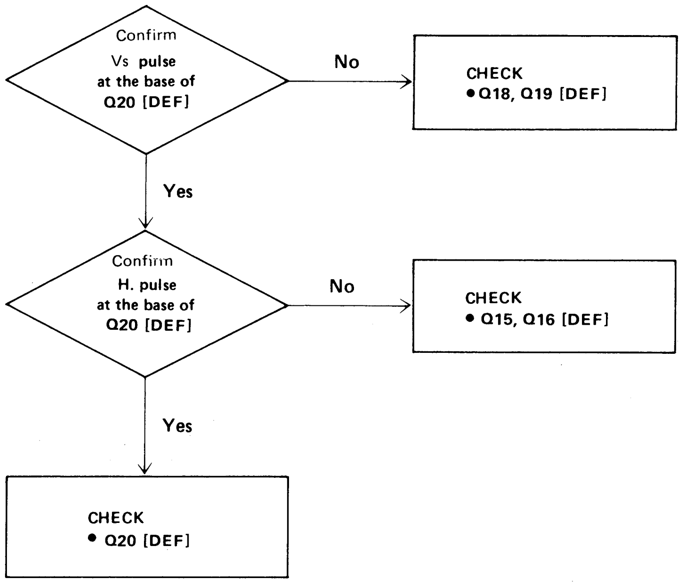
SYMPTOM (1) : No Video (Luminance) on Electronic Viewfinder or Monitor


EVF Raster Present?
No
SEE SYMPTOM (10)
Yes
Pick-up tube Socket Voltages OK ?
No
CHECK
• PICK-UP TUBE
• Z1 [DEF]
Yes
H. DEF at pin 2 and V. DEF at pin 5 of CN3 [DEF]
No
CHECK
• Q15, Q16, Q17 [DEF]
• IC2, IC3 [DEF]
Yes
WAVEFORM PRESENT at TP1 [PROCESS]
No
Touch to Target lead Noise ?
No
SUSPECT
• PREAMP
Yes
Remove lens. Picture becomes white
No
SUSPECT
• Pick-up Tube
• Target Contact
Yes
SUSPECT
• Lens
• Auto Iris Circuit [AUDIO/ LENS CONT]
Yes
Confirm signal at TP3 [PROCESS]
No
SUSPECT
• IC2 [PROCESS]
Yes
Confirm signal at TP5 [PROCESS]
No
Pin 24 of IC8 [PROCESS] is > 1.4 (V)
No
SUSPECT
• IC8 [PROCESS]
Yes
SUSPECT
• IC1 [PROCESS]
Yes
CHECK
• Camera Cable
• VTR

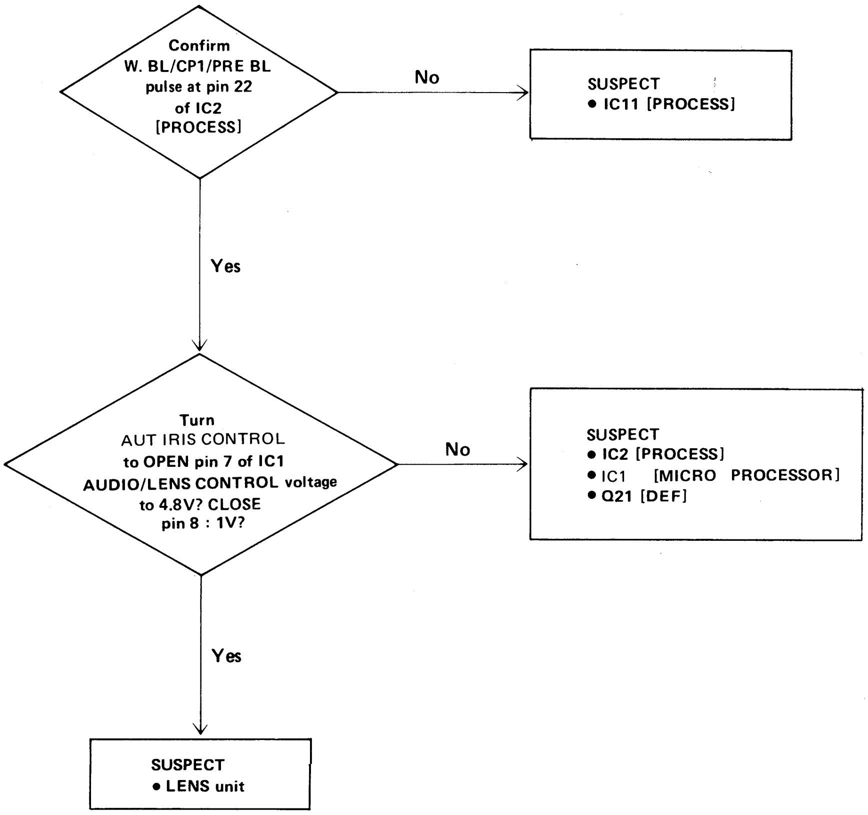
SYMPTOM (2) : No Colour on Monitor


Confirm R and B signals at pin 1 and 3 of CN1 while setting SW1 (YL) to OFF [PROCESS]
No
SUSPECT
• IC3, IC4 [PROCESS]
Yes
Confirm YL signal at pin 2 of CN1 Reset SW1 (YL) to ON [PROCESS]
No
SUSPECT
• IC8 [PROCESS]
Yes
Confirm Subcarrier at pin 14 and 16 of IC10 [PROCESS]
No
SUSPECT
• IC11 [PROCESS]
Yes
Confirm pin 10 of IC10 = 1.8V ? [PROCESS]
No
SUSPECT
• IC3 [PROCESS]
Yes
Confirm Chroma signal at pin 12 of IC10 [PROCESS]
No
SUSPECT
• IC10 [PROCESS]
Yes
Confirm Chroma signal at pin 22 of IC8 [PROCESS]
No
SUSPECT
• Q32
Yes
Confirm Burst signal at pin 12 of IC8 [PROCESS]
No
SUSPECT
• Q33, Q34 [PROCESS]
Yes
SUSPECT
• IC8 [PROCESS]

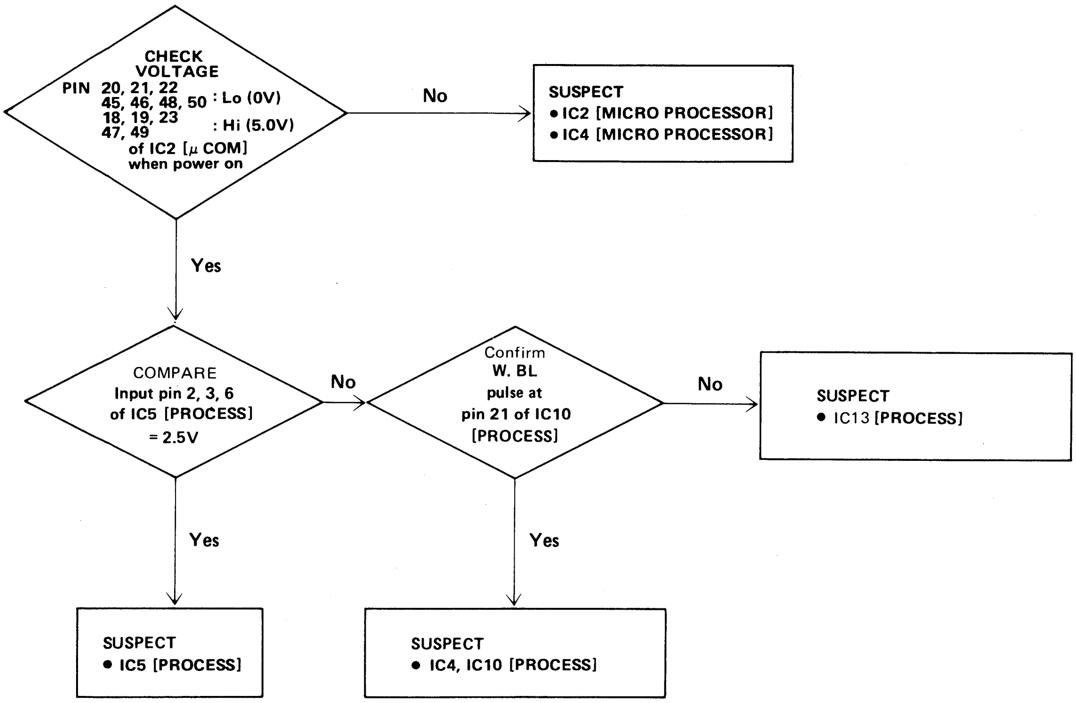
SYMPTOM (3) : Retrace Line in Electronic Viewfinder and Monitor


Confirm
Vs pulse
at the base of
Q20 [DEF]
No
CHECK
• Q18, Q19 [DEF]
Yes
Confirm
H. pulse
at the base of
Q20 [DEF]
No
CHECK
• Q15, Q16 [DEF]
Yes
CHECK
• Q20 [DEF]

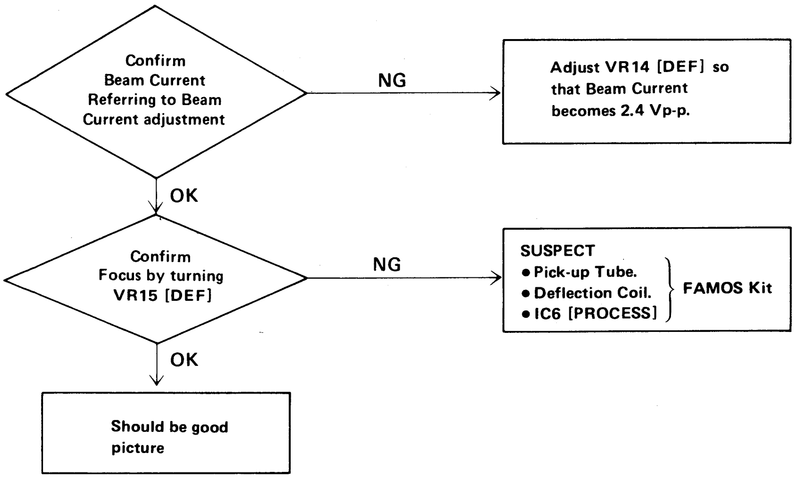
SYMPTOM (4) : Video Level Too High/Low
White Picture Areas Blooming
No/Incorrect Iris Operation


Confirm
W. BL/CP1/PRE BL
pulse at pin 22
of IC2
[PROCESS]
No
SUSPECT
• IC11 [PROCESS]
Yes
Turn
AUT IRIS CONTROL
to OPEN pin 7 of IC1
AUDIO/LENS CONTROL voltage
to 4.8V? CLOSE
pin 8 : 1V?
No
SUSPECT
• IC2 [PROCESS]
• IC1 [MICRO PROCESSOR]
• Q21 [DEF]
Yes
SUSPECT
• LENS unit

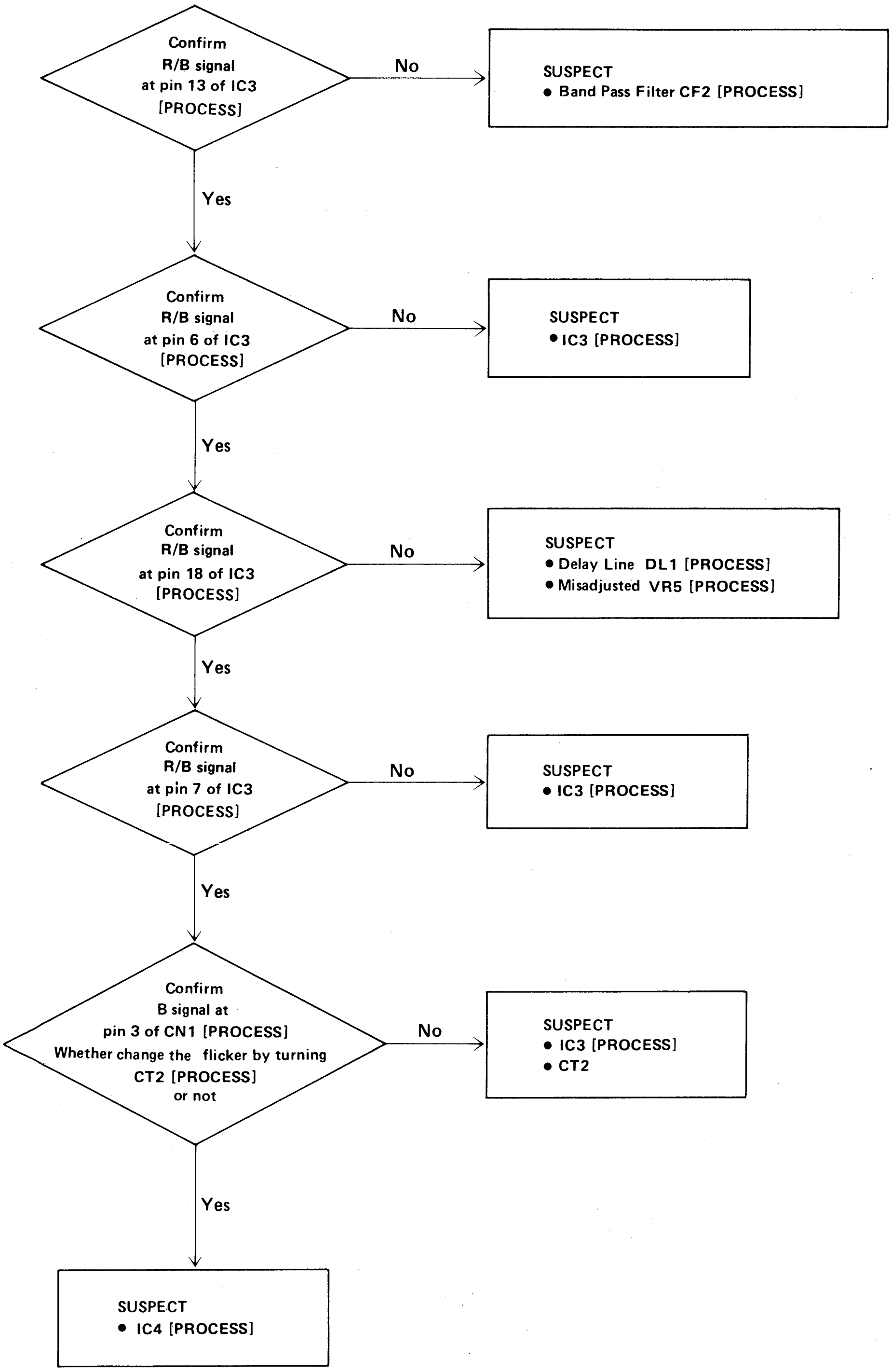
SYMPTOM (5) : Incorrect White Set Operation Red, Blue, or Green Tinted Picture


CHECK
VOLTAGE
PIN 20, 21, 22
45, 46, 48, 50 : Lo (0V)
18, 19, 23
47, 49 : Hi (5.0V)
of IC2 [μ COM]
when power on
No
SUSPECT
• IC2 [MICRO PROCESSOR]
• IC4 [MICRO PROCESSOR]
Yes
COMPARE
Input pin 2, 3, 6
of IC5 [PROCESS]
= 2.5V
No
Confirm
W. BL
pulse at
pin 21 of IC10
[PROCESS]
No
SUSPECT
• IC13 [PROCESS]
Yes
Yes
SUSPECT
• IC5 [PROCESS]
SUSPECT
• IC4, IC10 [PROCESS]

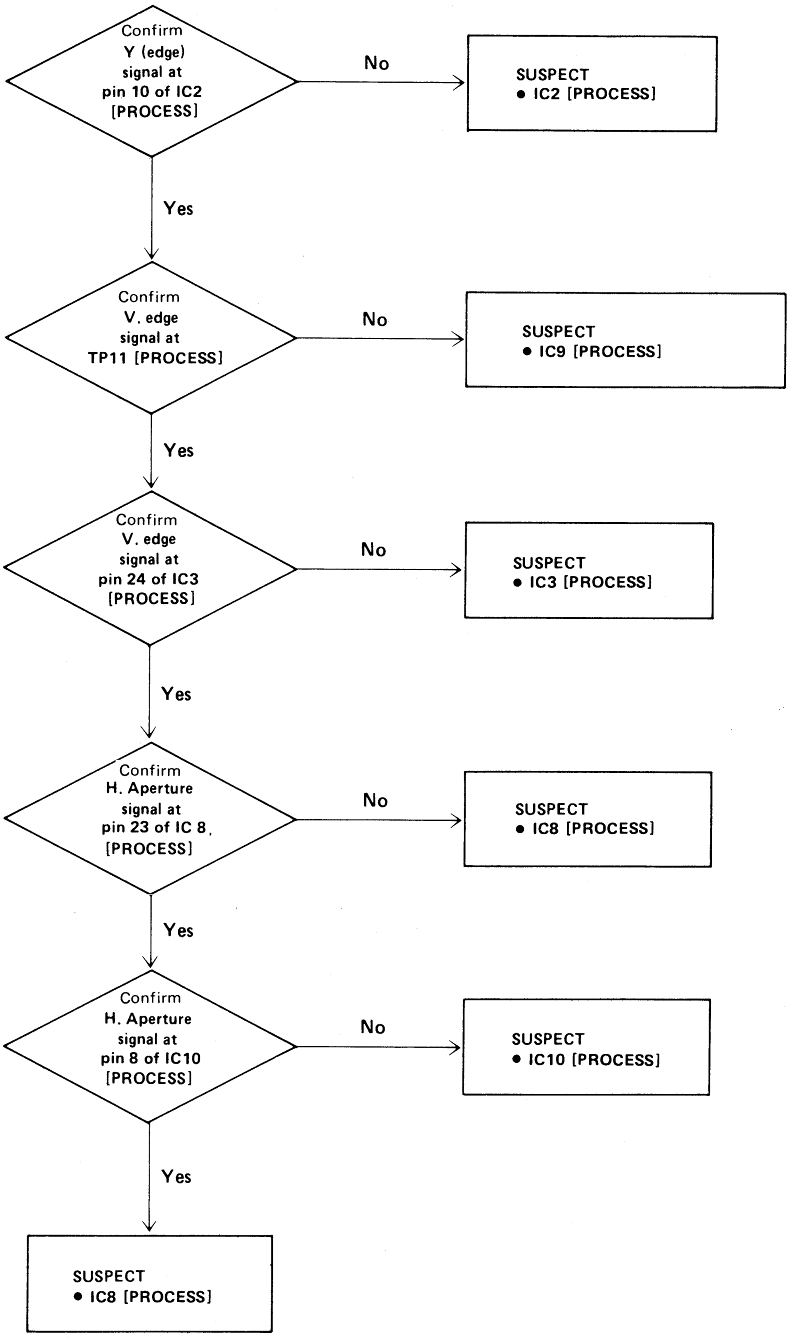
SYMPTOM (6) : Colour Shading


Confirm
Beam Current
Referring to Beam
Current adjustment
NG
Adjust VR14 [DEF] so that Beam Current becomes 2.4 Vp-p.
OK
Confirm
Focus by turning
VR15 [DEF]
NG
SUSPECT
• Pick-up Tube.
• Deflection Coil.
• IC6 [PROCESS]
FAMOS Kit
OK
Should be good picture

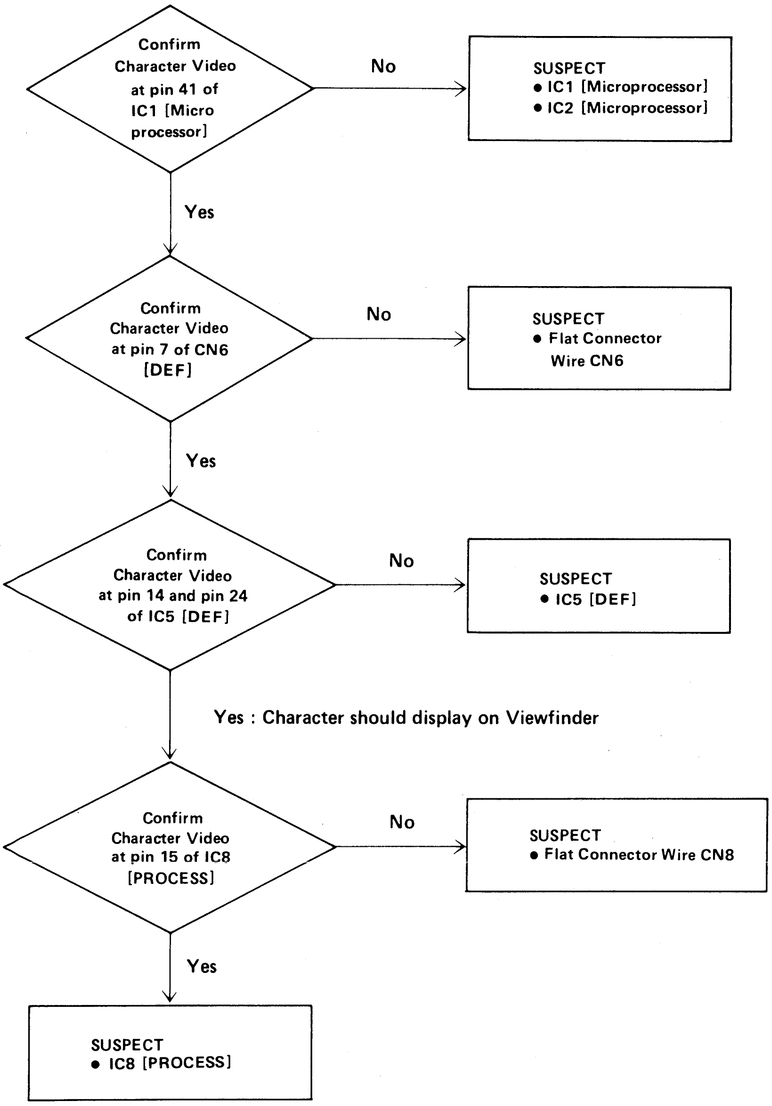
SYMPTOM (7): Incorrect Colour
No Red or Blue Separation


Confirm R/B signal at pin 13 of IC3 [PROCESS]
No
SUSPECT
• Band Pass Filter CF2 [PROCESS]
Yes
Confirm R/B signal at pin 6 of IC3 [PROCESS]
No
SUSPECT
• IC3 [PROCESS]
Yes
Confirm R/B signal at pin 18 of IC3 [PROCESS]
No
SUSPECT
• Delay Line DL1 [PROCESS]
• Misadjusted VR5 [PROCESS]
Yes
Confirm R/B signal at pin 7 of IC3 [PROCESS]
No
SUSPECT
• IC3 [PROCESS]
Yes
Confirm B signal at pin 3 of CN1 [PROCESS] Whether change the flicker by turning CT2 [PROCESS] or not
No
SUSPECT
• IC3 [PROCESS]
• CT2
Yes
SUSPECT
• IC4 [PROCESS]

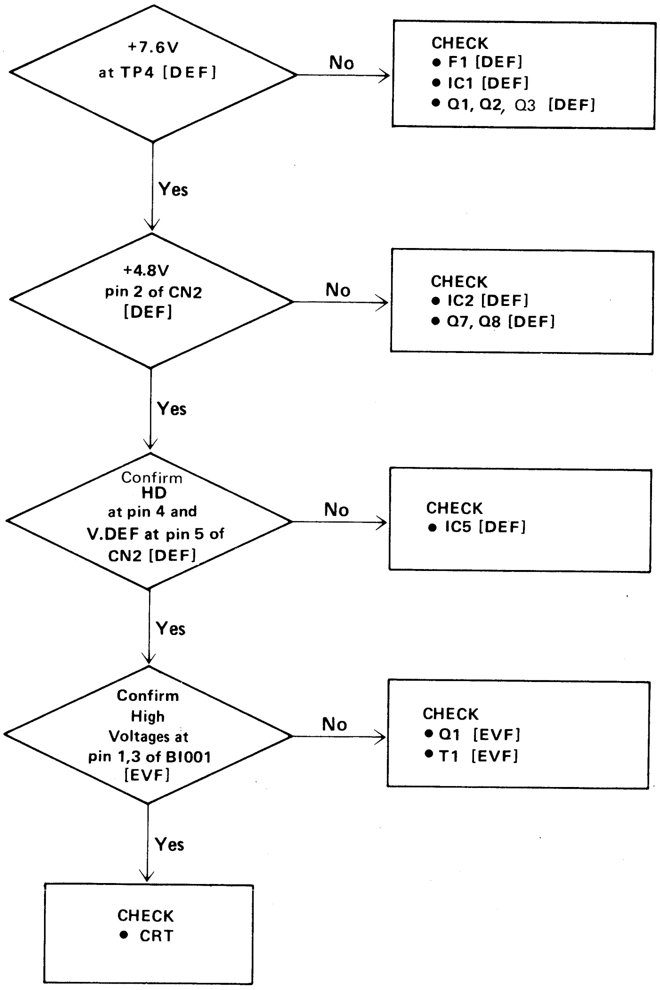
SYMPTOM (8): Soft Picture
No Vertical or Horizontal Detail


Confirm Y (edge) signal at pin 10 of IC2 [PROCESS]
No
SUSPECT • IC2 [PROCESS]
Yes
Confirm V. edge signal at TP11 [PROCESS]
No
SUSPECT • IC9 [PROCESS]
Yes
Confirm V. edge signal at pin 24 of IC3 [PROCESS]
No
SUSPECT • IC3 [PROCESS]
Yes
Confirm H. Aperture signal at pin 23 of IC 8, [PROCESS]
No
SUSPECT • IC8 [PROCESS]
Yes
Confirm H. Aperture signal at pin 8 of IC10 [PROCESS]
No
SUSPECT • IC10 [PROCESS]
Yes
SUSPECT • IC8 [PROCESS]

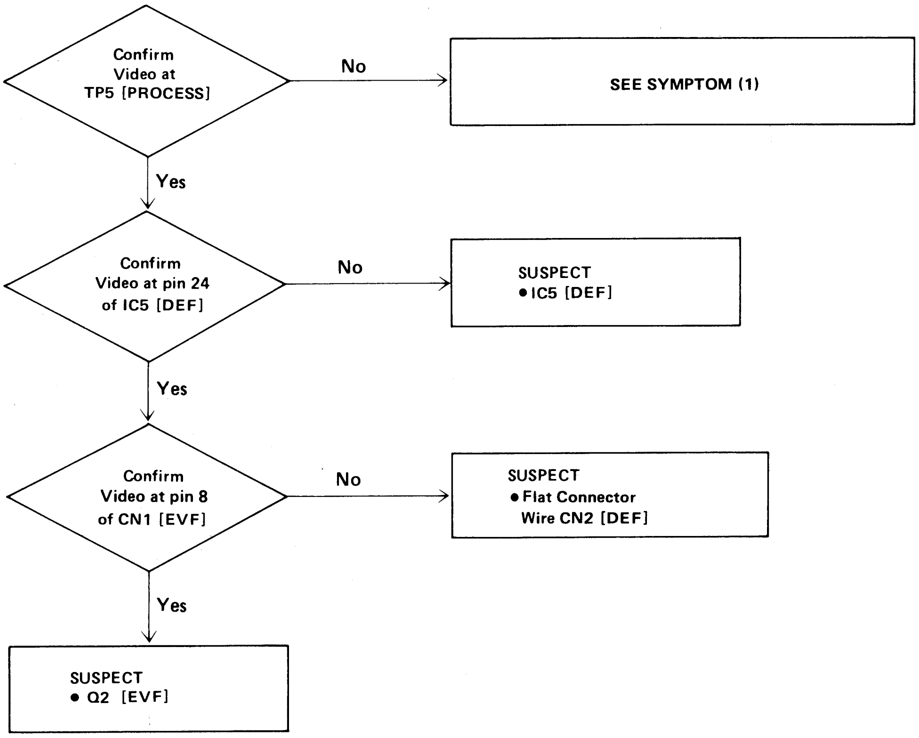
SYMPTOM (9) : No Character Display on Viewfinder or Monitor


Confirm Character Video at pin 41 of IC1 [Micro processor]
No
SUSPECT
• IC1 [Microprocessor]
• IC2 [Microprocessor]
Yes
Confirm Character Video at pin 7 of CN6 [DEF]
No
SUSPECT
• Flat Connector Wire CN6
Yes
Confirm Character Video at pin 14 and pin 24 of IC5 [DEF]
No
SUSPECT
• IC5 [DEF]
Yes : Character should display on Viewfinder
Confirm Character Video at pin 15 of IC8 [PROCESS]
No
SUSPECT
• Flat Connector Wire CN8
Yes
SUSPECT
• IC8 [PROCESS]

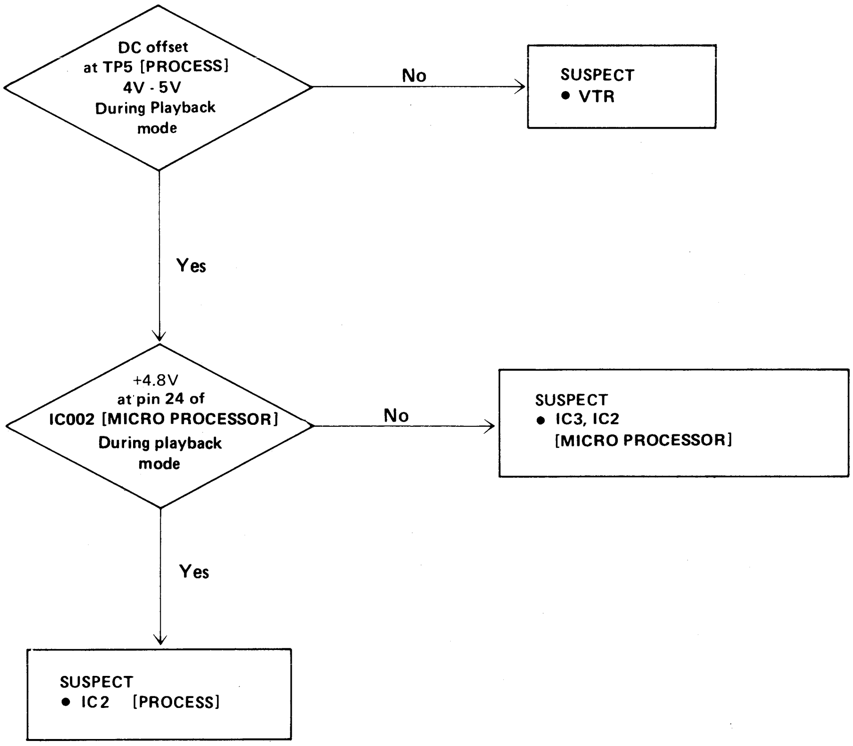
SYMPTOM (10) : No Raster on Electronic Viewfinder


+7.6V at TP4 [DEF]
No
CHECK
● F1 [DEF]
● IC1 [DEF]
● Q1, Q2, Q3 [DEF]
Yes
+4.8V pin 2 of CN2 [DEF]
No
CHECK
● IC2 [DEF]
● Q7, Q8 [DEF]
Yes
Confirm HD at pin 4 and V.DEF at pin 5 of CN2 [DEF]
No
CHECK
● IC5 [DEF]
Yes
Confirm High Voltages at pin 1,3 of BI001 [EVF]
No
CHECK
● Q1 [EVF]
● T1 [EVF]
Yes
CHECK
● CRT

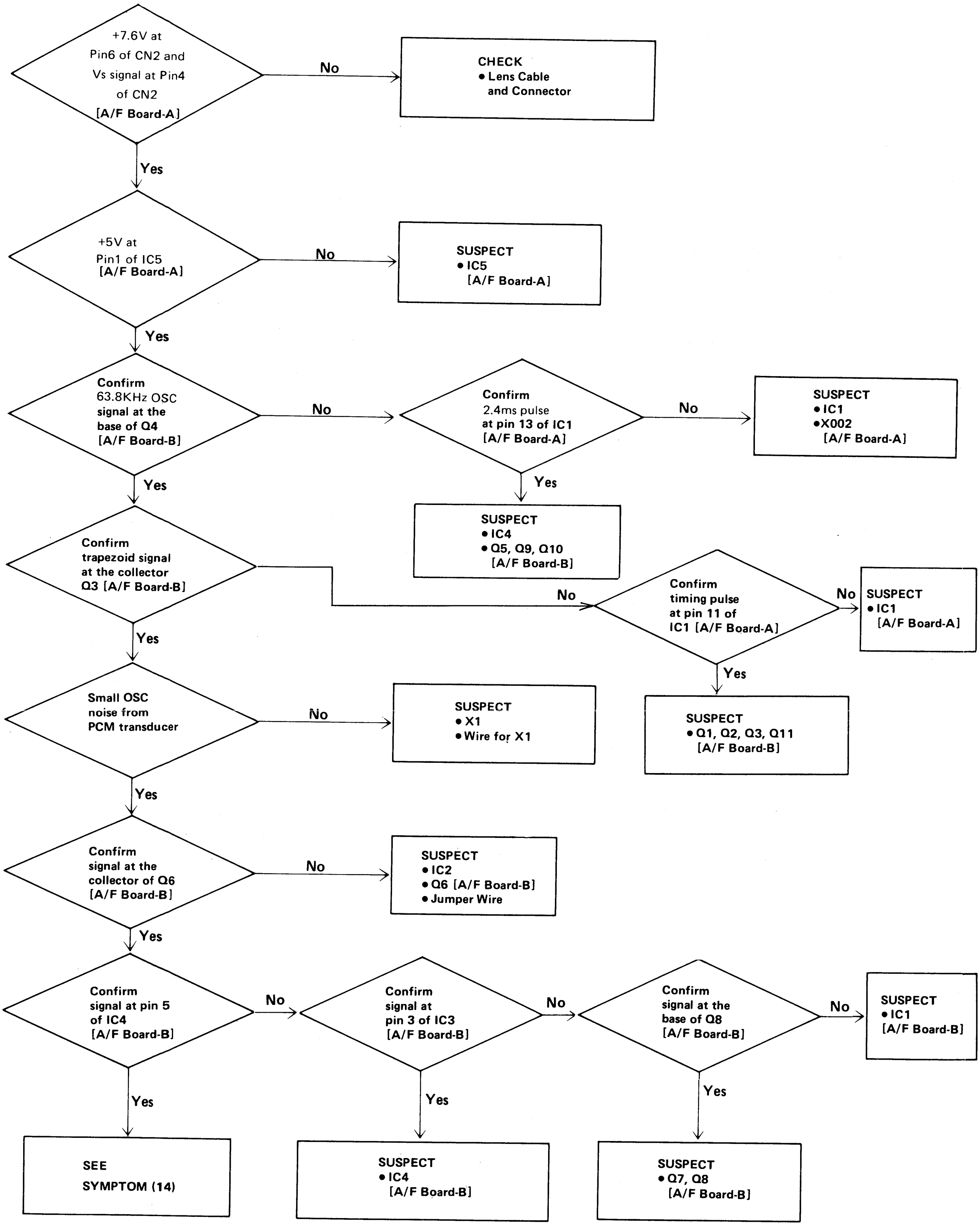
SYMPTOM (11) : No Video on Electronic Viewfinder Only


Confirm Video at TP5 [PROCESS]
No
SEE SYMPTOM (1)
Yes
Confirm Video at pin 24 of IC5 [DEF]
No
SUSPECT
• IC5 [DEF]
Yes
Confirm Video at pin 8 of CN1 [EVF]
No
SUSPECT
• Flat Connector Wire CN2 [DEF]
Yes
SUSPECT
• Q2 [EVF]

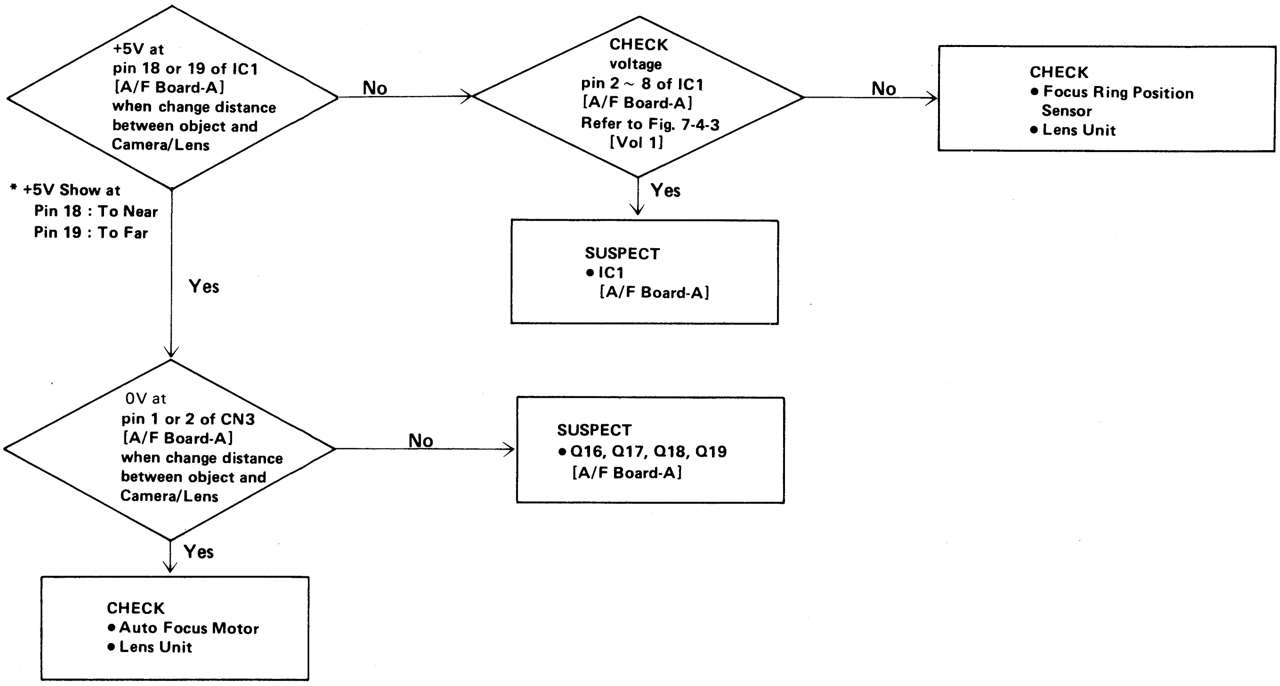
SYMPTOM (12) : Two Separate Images on Electronic Viewfinder Screen During Playback Mode


DC offset at TP5 [PROCESS] 4V - 5V During Playback mode
No
SUSPECT
• VTR
Yes
+4.8V at pin 24 of IC002 [MICRO PROCESSOR] During playback mode
No
SUSPECT
• IC3, IC2 [MICRO PROCESSOR]
Yes
SUSPECT
• IC2 [PROCESS]

SYMPTOM (13) : Auto Focus Does Not Work –(1)


+7.6V at Pin6 of CN2 and Vs signal at Pin4 of CN2 [A/F Board-A]
No
CHECK
• Lens Cable and Connector
Yes
+5V at Pin1 of IC5 [A/F Board-A]
No
SUSPECT
• IC5 [A/F Board-A]
Yes
Confirm 63.8KHz OSC signal at the base of Q4 [A/F Board-B]
No
Confirm 2.4ms pulse at pin 13 of IC1 [A/F Board-A]
No
SUSPECT
• IC1
• X002 [A/F Board-A]
Yes
SUSPECT
• IC4
• Q5, Q9, Q10 [A/F Board-B]
Yes
Confirm trapezoid signal at the collector Q3 [A/F Board-B]
No
Confirm timing pulse at pin 11 of IC1 [A/F Board-A]
No
SUSPECT
• IC1 [A/F Board-A]
Yes
SUSPECT
• Q1, Q2, Q3, Q11 [A/F Board-B]
Yes
Small OSC noise from PCM transducer
No
SUSPECT
• X1
• Wire for X1
Yes
Confirm signal at the collector of Q6 [A/F Board-B]
No
SUSPECT
• IC2
• Q6 [A/F Board-B]
• Jumper Wire
Yes
Confirm signal at pin 5 of IC4 [A/F Board-B]
No
Confirm signal at pin 3 of IC3 [A/F Board-B]
No
Confirm signal at the base of Q8 [A/F Board-B]
No
SUSPECT
• IC1 [A/F Board-B]
Yes
SEE SYMPTOM (14)
Yes
SUSPECT
• IC4 [A/F Board-B]
Yes
SUSPECT
• Q7, Q8 [A/F Board-B]

SYMPTOM (14) : Auto Focus Does Not Work –(2)


+5V at
pin 18 or 19 of IC1
[A/F Board-A]
when change distance
between object and
Camera/Lens
No
CHECK
voltage
pin 2 ~ 8 of IC1
[A/F Board-A]
Refer to Fig. 7-4-3
[Vol 1]
No
CHECK
• Focus Ring Position Sensor
• Lens Unit
Yes
SUSPECT
• IC1
[A/F Board-A]
* +5V Show at
Pin 18 : To Near
Pin 19 : To Far
Yes
0V at
pin 1 or 2 of CN3
[A/F Board-A]
when change distance
between object and
Camera/Lens
No
SUSPECT
• Q16, Q17, Q18, Q19
[A/F Board-A]
Yes
CHECK
• Auto Focus Motor
• Lens Unit

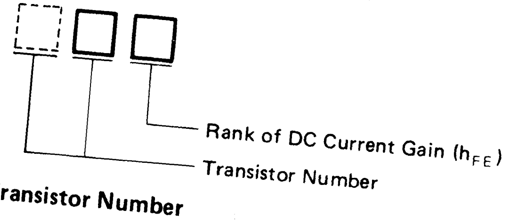
SYMPTOM (15) : Can Not Get Just Focus

- Check Backfocus on Camera
- Check Auto Focus Adjustment

7. CHIP COMPONENTS

1. Chip Transistor

The transistor number is indicated on the top surface of the chip transistor using two alphabet letters or one numerical and two alphabet letters.


Rank of DC Current Gain (h_{FE})
Transistor Number

Transistor Number

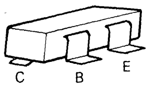
Letter	Transistor No.	Letter	Transistor No.
A	2SB709	X	2SD602A
B	2SB709A	Y	2SD601
C	2SB710	Z	2SD601A
D	2SB710A	1Z	2SD1030
E	2SA1022	1N	2SK199
F	2SA1034	1O	2SK198
H	2SA1035	1A	2SB799
I	2SB792	1B	2SB814
K	2SC2778	1C	2SB902
P	2SD814	1F	2SK321
Q	2SD813	1L	2SK247
R	2SC2480	1K	2SK316
S	2SC2405	1M	2SJ84
T	2SC2406	1T	2SC3077
U	2SC2404	1X	2SC2845
V	2SC2295	2B	2SK374
W	2SD602	2C	2SK116

Example

WQ ⟶ 2SD602 – Q
YQ ⟶ 2SD601 – Q
1BS ⟶ 2SB814 – S

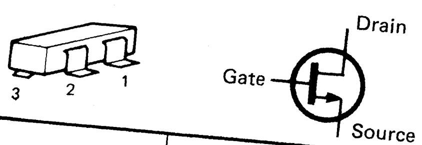
Appearance and Symbols

Transistor



C: Collector
B: Base
E: Emitter

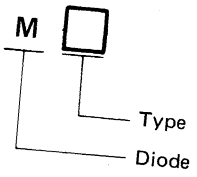
FET


3
2
1
Drain
Gate
Source

	1	2	3
Except 2SK199	Drain	Source	Gate
2SK199	Gate	Drain	Source

2. Chip Diode

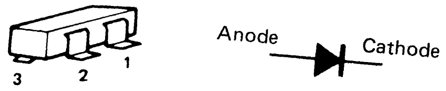
The diode number is indicated on the top surface of the chip diode using Two alphabet letters.


M
Type
Diode

Diode Number

Letter	Diode No.	Letter	Diode No.
MA	MA151A	MI	MA152K
MB	MA152A	MK	MA28W-B
MC	MA153	ML	MA28T-A
MD	MA28-A	MN	MA151WA
ME	MA28-B	MO	MA152WA
MF	MA28W-A	MT	MA151WK
MH	MA151K	MU	MA152WK

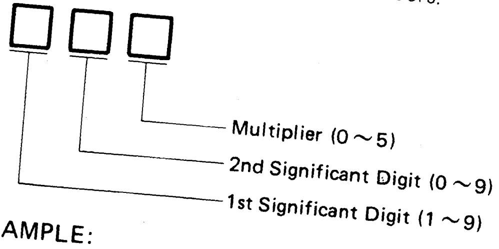
Appearance and Symbols


3
2
1
Anode
Cathode

	1	2	3
MA28/28W/28T	–	Anode	Cathode
MA151K/152K	–	Anode	Cathode
MA151A/152A	–	Cathode	Anode
MA151WK/MA152WK	Anode	Anode	Cathode
MA151WA/MA152WA	Cathode	Cathode	Anode
MA153	Cathode	Anode	Common

2. Chip Resistor

The resistor value is indicated on the bottom surface of the chip resistor using three digit numbers.


Multiplier (0 ~ 5)
2nd Significant Digit (0 ~ 9)
1st Significant Digit (1 ~ 9)

EXAMPLE:

330 ⟶ $33 \times 10^0 = 33$ ohms
561 ⟶ $56 \times 10^1 = 560$ ohms
123 ⟶ $12 \times 10^3 = 12$ kohms

Note: Zero ohm resistor (jumper chip) is colored red or green.

3. Chip Capacitor

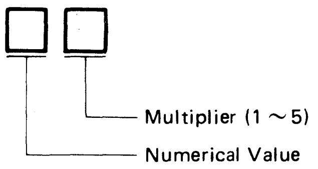
The capacitive value of replacement chip capacitors is indicated on the bottom surface. Original parts do not have value indication.

If the capacitive value is less than 100 pF, the value will be indicated by one or two digit number expressing the capacity directly in pF.

EXAMPLE:

0.5 ⟶ 0.5 pF　2.5 ⟶ 2.5 pF
.75 ⟶ 0.75 pF　33 ⟶ 33 pF
1 ⟶ 1 pF　82 ⟶ 82 pF

If the capacitive value is 100 pF or greater, the value will be indicated by an alpha-numeric code. The letter precedes the number and expresses a numerical value to be multiplied by the number which follows.



Numerical Value

Letter	Value	Letter	Value
A	10	N	33
B	11	P	36
C	12	Q	39
D	13	R	43
E	15	S	47
F	16	T	51
G	18	U	56
H	20	V	62
J	22	W	68
K	24	X	75
L	27	Y	82
M	30	Z	91

* Letters I and O are not used.

EXAMPLE:

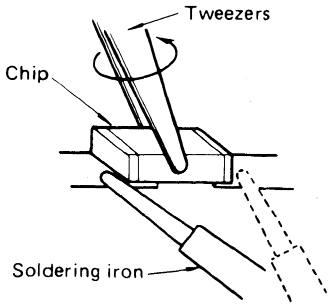
A1 ⟶ $10 \times 10^1 = 100$ pF
N2 ⟶ $33 \times 10^2 = 3300$ pF
S3 ⟶ $47 \times 10^3 = 47000$ pF

4. Precautions in replacing the chip component

1. Make sure that the unit is turned OFF when replacing the chip.
2. Use tweezers to prevent any damage to the chip surface.
3. Do not re-use the chips after removal.
4. Do not rub the electrode of chips.
5. Do not subject the chips to excessive stress.
6. It is recommended that a pencil-type soldering iron to be used.
7. The solder whose diameter is less than 0.5 mm is recommended.
8. Do not heat the chip beyond 3 seconds.
9. Maintain temperature control under 260°C (500°F) when soldering.

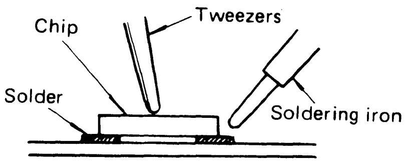
4-1 Removal

1. Add the solder to both ends of the chip (three leads for chip transistor).
2. While attaching the soldering iron to both ends of the chip (three leads for chip transistor) as shown below, remove the chip by turning it with tweezers.
   Note: Be careful not to damage other chips.

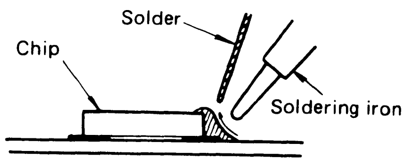


4-2 Mounting

1. Place the solder thinly on the chip mounting foil.
2. Solder the chip temporarily while holding the chip with the tweezers.



3. Solder both ends of chip (three leads for chip transistor).



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Service Manual

Vol. 3

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Schematic Diagrams
Conductor Views

Colour Video Cameras

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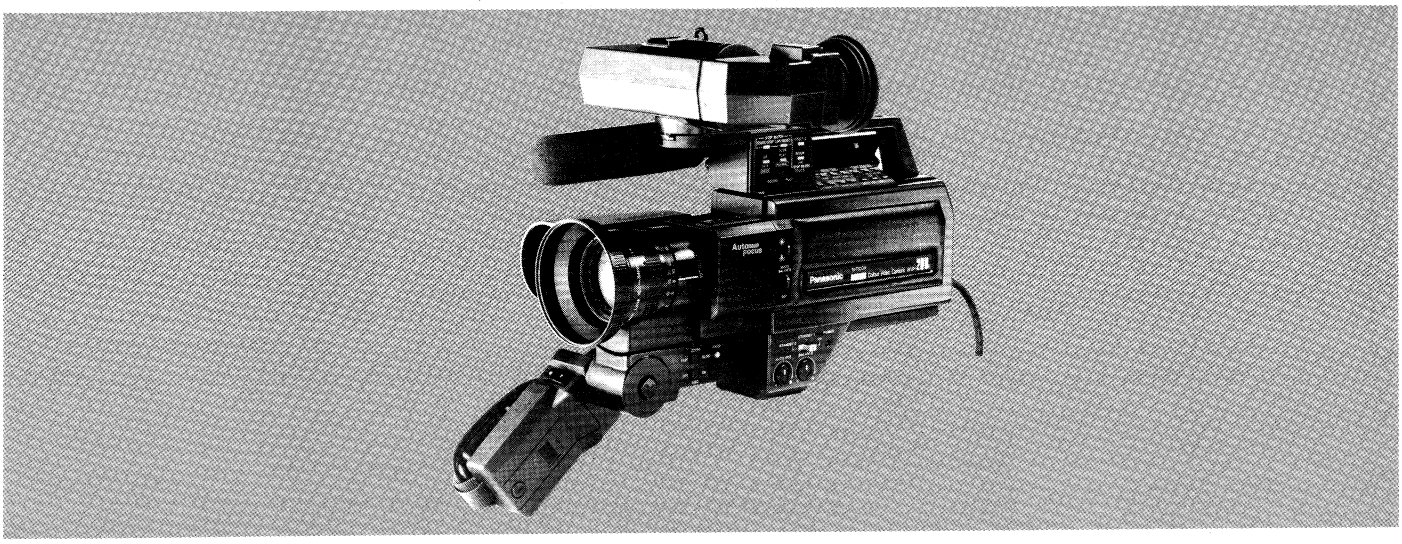

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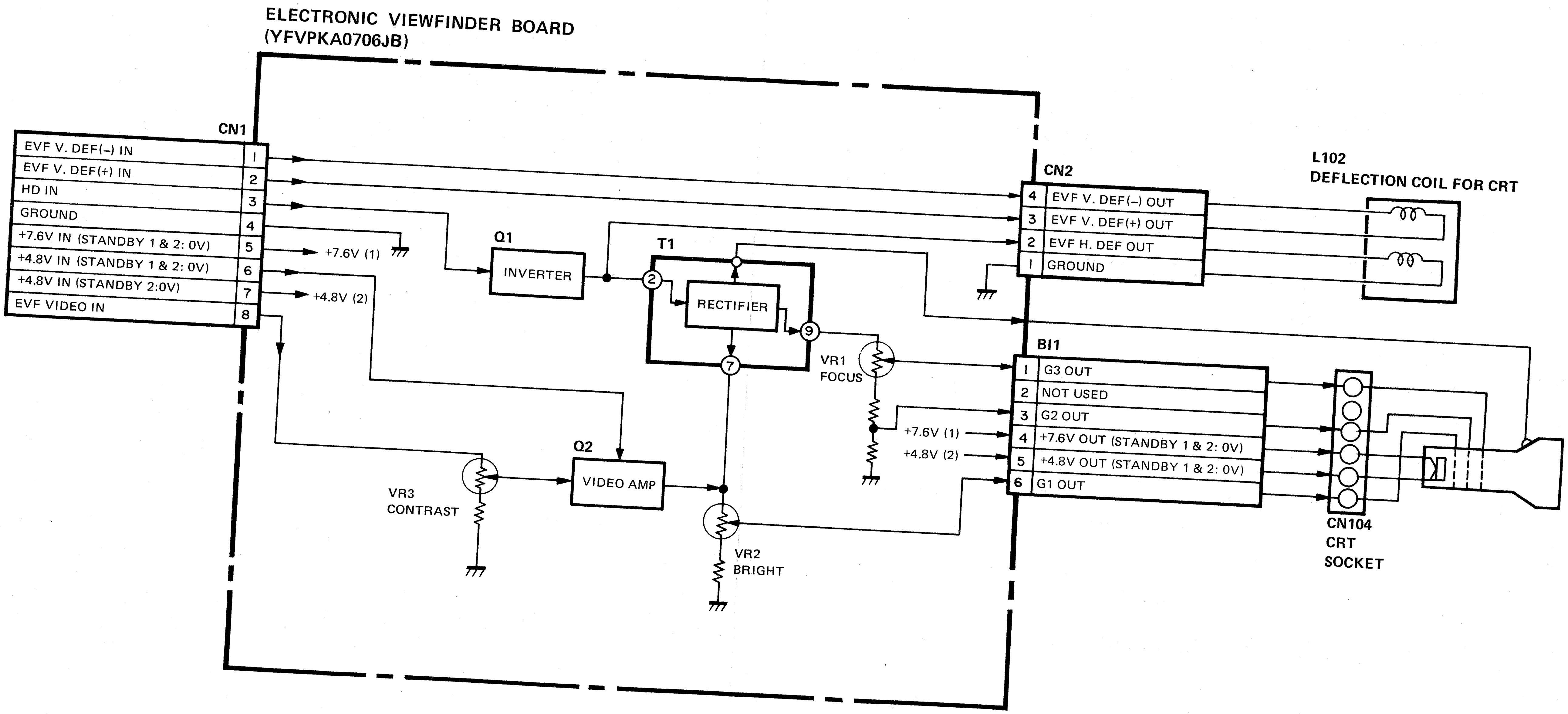
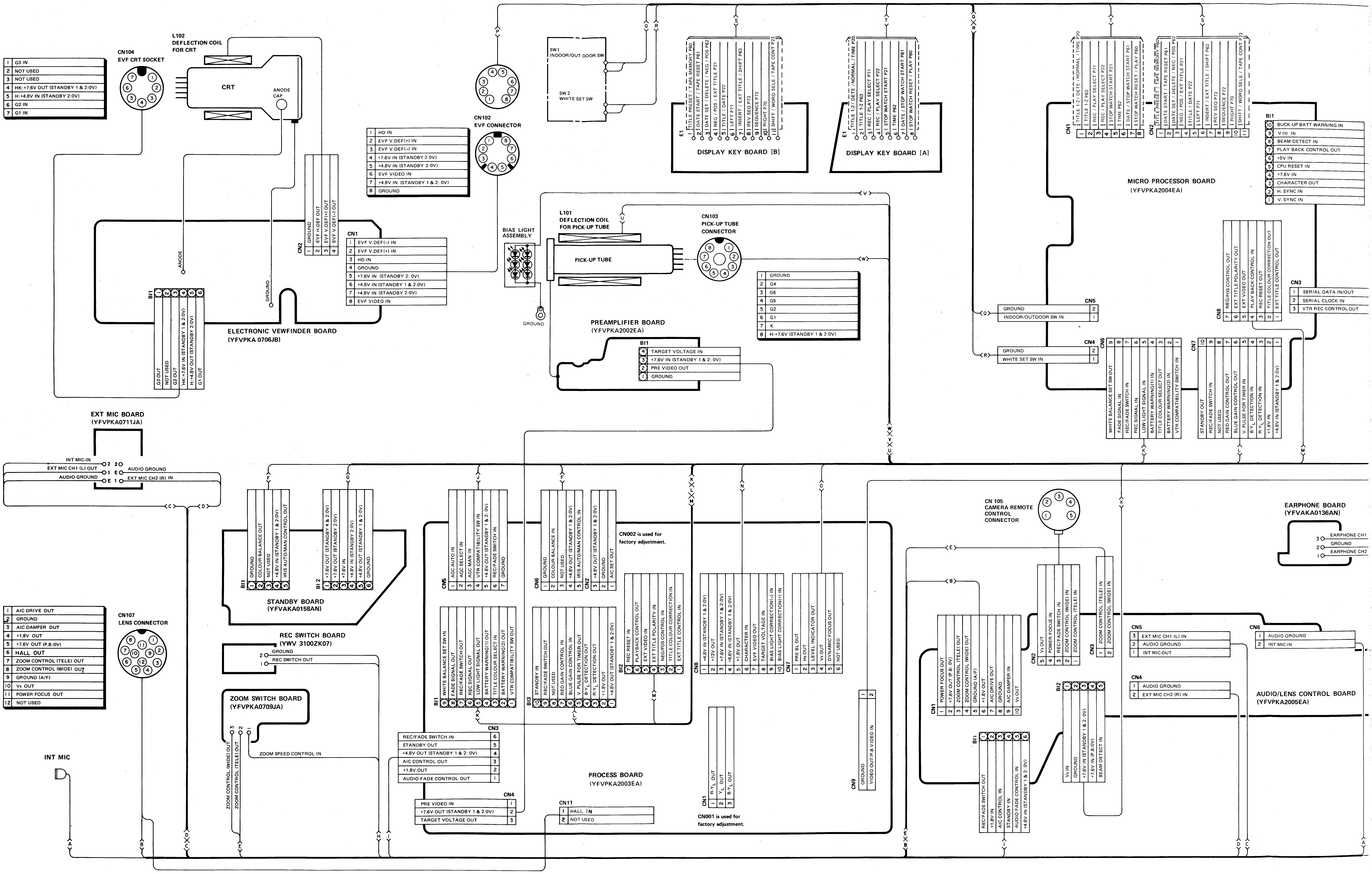
National/Panasonic

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

BLOCK DIAGRAM OF ELECTRONIC VIEWFINDER BOARD (YFVPKA0706JB)


ELECTRONIC VIEWFINDER BOARD
(YFVPKA0706JB)
CN1
EVF V. DEF(–) IN 1
EVF V. DEF(+) IN 2
HD IN 3
GROUND 4
+7.6V IN (STANDBY 1 & 2: 0V) 5
+4.8V IN (STANDBY 1 & 2: 0V) 6
+4.8V IN (STANDBY 2:0V) 7
EVF VIDEO IN 8
+7.6V (1)
+4.8V (2)
Q1
INVERTER
T1
2
RECTIFIER
9
7
VR1
FOCUS
Q2
VIDEO AMP
VR3
CONTRAST
VR2
BRIGHT
+7.6V (1)
+4.8V (2)
CN2
4 EVF V. DEF(–) OUT
3 EVF V. DEF(+) OUT
2 EVF H. DEF OUT
1 GROUND
L102
DEFLECTION COIL FOR CRT
BI1
1 G3 OUT
2 NOT USED
3 G2 OUT
4 +7.6V OUT (STANDBY 1 & 2: 0V)
5 +4.8V OUT (STANDBY 1 & 2: 0V)
6 G1 OUT
CN104
CRT
SOCKET

WIRING DIAGRAM



CN104
EVF CRT SOCKET
1 G3 IN
2 NOT USED
3 NOT USED
4 HK:+7.6V OUT (STANDBY 1 & 2:0V)
5 H:+4.8V IN (STANDBY 2:0V)
6 G2 IN
7 G1 IN
L102
DEFLECTION COIL
FOR CRT
CRT
ANODE CAP
CN102
EVF CONNECTOR
1 HD IN
2 EVF V.DEF(+) IN
3 EVF V.DEF(–) IN
4 +7.6V IN (STANDBY 2:0V)
5 +4.8V IN (STANDBY 2:0V)
6 EVF VIDEO IN
7 +4.8V IN (STANDBY 1 & 2: 0V)
8 GROUND
CN2
1 GROUND
2 EVF H.DEF OUT
3 EVF V.DEF(+) OUT
4 EVF V.DEF(–) OUT
CN1
1 EVF V.DEF(–) IN
2 EVF V.DEF(+) IN
3 HD IN
4 GROUND
5 +7.6V IN (STANDBY 2: 0V)
6 +4.8V IN (STANDBY 1 & 2: 0V)
7 +4.8V IN (STANDBY 2:0V)
8 EVF VIDEO IN
ANODE
GROUND
BI1
1 G3 OUT
2 NOT USED
3 G2 OUT
4 HK:+7.6V IN (STANDBY 1 & 2:0V)
5 H:+4.8V OUT (STANDBY 2:0V)
6 G1 OUT
ELECTRONIC VEWFINDER BOARD
(YFVPKA 0706JB)
SW1
INDOOR/OUT DOOR SW
SW 2
WHITE SET SW
BIAS LIGHT ASSEMBLY
L101
DEFLECTION COIL
FOR PICK-UP TUBE
PICK-UP TUBE
CN103
PICK-UP TUBE CONNECTOR
1 GROUND
2 G4
3 G6
4 G5
5 G2
6 G1
7 K
8 H:+7.6V (STANDBY 1 & 2:0V)
GROUND
PREAMPLIFIER BOARD
(YFVPKA2002EA)
BI1
4 TARGET VOLTAGE IN
3 +7.6V IN (STANDBY 1 & 2:0V)
2 PRE VIDEO OUT
1 GROUND
E1
1 TITLE PRESET / TAPE MEMORY P60
2 DATE START / TAPE RESET P61
3 DATE SET / DELETE / NEG / POS P62
4 NEG / POS / EXT TITLE P21
5 TITLE / DATE P22
6 LEFT P71
7 INSERT / EXT TITLE / SHIFT P63
8 REV SEQ P73
9 SEQUENCE P72
10 RIGHT P70
11 SHIFT / WORD SELE / TAPE CONT P23
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2 TITLE 1-2 P63
3 REC / PLAY SELECT P71
4 REC / PLAY SELECT P22
5 STOP WATCH START P21
6 TIME P62
7 DATE / STOP WATCH START P61
8 STOP WATCH RESET / PLAY P60
DISPLAY KEY BOARD [A]
CN1
1 TITLE 1-2 / DETE / NORMAL / TIME P20
2 TITLE 1-2 P63
3 REC / PLAY SELECT P71
4 REC / PLAY SELECT P22
5 STOP WATCH START P21
6 TIME P62
7 DATE / STOP WATCH START P61
8 STOP WATCH RESET / PLAY P60
CN2
1 TITLE PRESET / TAPE MEMORY P60
2 DATE START / TAPE RESET P61
3 DATE SET / DELETE / NEG / POS P62
4 NEG / POS / EXT TITLE P21
5 TITLE / DATE P22
6 LEFT P71
7 INSERT / EXT TITLE / SHIFT P63
8 REV SEQ P73
9 SEQUENCE P72
10 RIGHT P70
11 SHIFT / WORD SELE / TAPE CONT P23
BI1
10 BUCK-UP BATT WARNING IN
9 V DD IN
8 BEAM DETECT IN
7 PLAY BACK CONTROL OUT
6 +5V IN
5 CPU RESET IN
4 +7.6V IN
3 CHARACTER OUT
2 H. SYNC IN
1 V. SYNC IN
MICRO PROCESSOR BOARD
(YFVPKA2004EA)
CN8
7 NEG/POS CONTROL OUT
6 EXT TITLE POLARITY OUT
5 EXT VIDEO OUT
4 PLAY BACK CONTROL IN
3 REC RESET OUT
2 TITLE COLOUR CORRECTION OUT
1 EXT TITLE CONTROL OUT
CN3
1 SERIAL DATA IN/OUT
2 SERIAL CLOCK IN
3 VTR REC CONTROL OUT
CN5
GROUND 2
INDOOR/OUTDOOR SW IN 1
CN4
GROUND 2
WHITE SET SW IN 1
CN6
9 WHITE BALANCE SET SW OUT
8 FADE SIGNAL IN
7 REC/FADE SWITCH IN
6 REC SIGNAL IN
5 LOW LIGHT SIGNAL IN
4 BATTERY WARNING(1) IN
3 TITLE COLOUR SELECT OUT
2 BATTERY WARNING(2) IN
1 VTR COMPATIBILITY SWITCH IN
CN7
10 STANDBY OUT
9 REC/FADE SWITCH IN
8 NOT USED
7 RED GAIN CONTROL OUT
6 BLUE GAIN CONTROL OUT
5 V. PULSE FOR TIMER IN
4 R-YL DETECTION IN
3 B-YL DETECTION IN
2 +1.8V IN
1 +4.8V IN (STANDBY 1 & 2: 0V)
EXT MIC BOARD
(YFVPKA0711JA)
INT MIC-IN
EXT MIC CH1 (L) OUT
AUDIO GROUND
AUDIO GROUND
EXT MIC CH2 (R) IN
BI1
1 GROUND
2 COLOUR BALANCE OUT
3 NOT USED
4 +4.8V IN (STANDBY 1 & 2:0V)
5 IRIS AUTO/MAN CONTROL OUT
BI 2
1 +7.6V OUT (STANDBY 1 & 2:0V)
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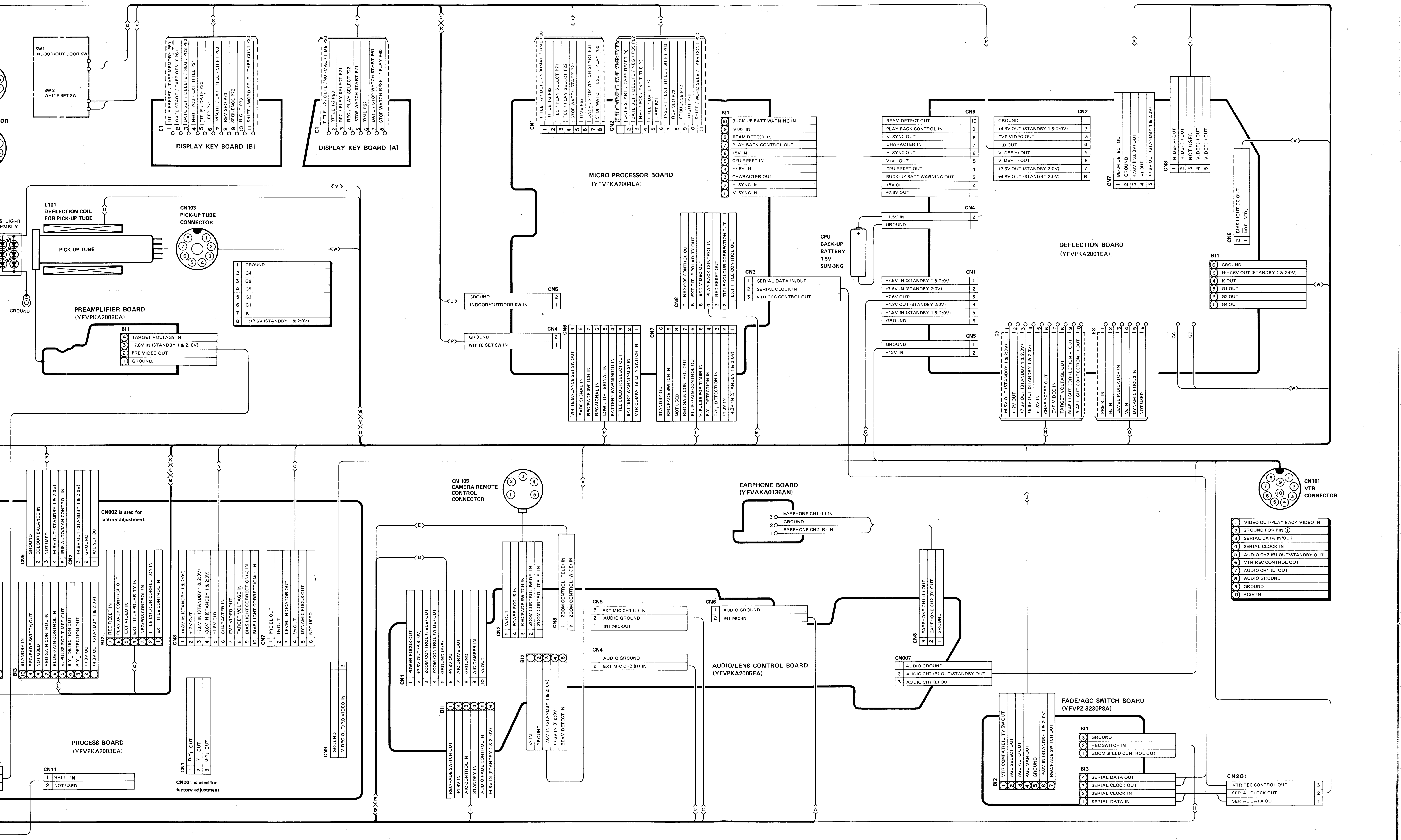
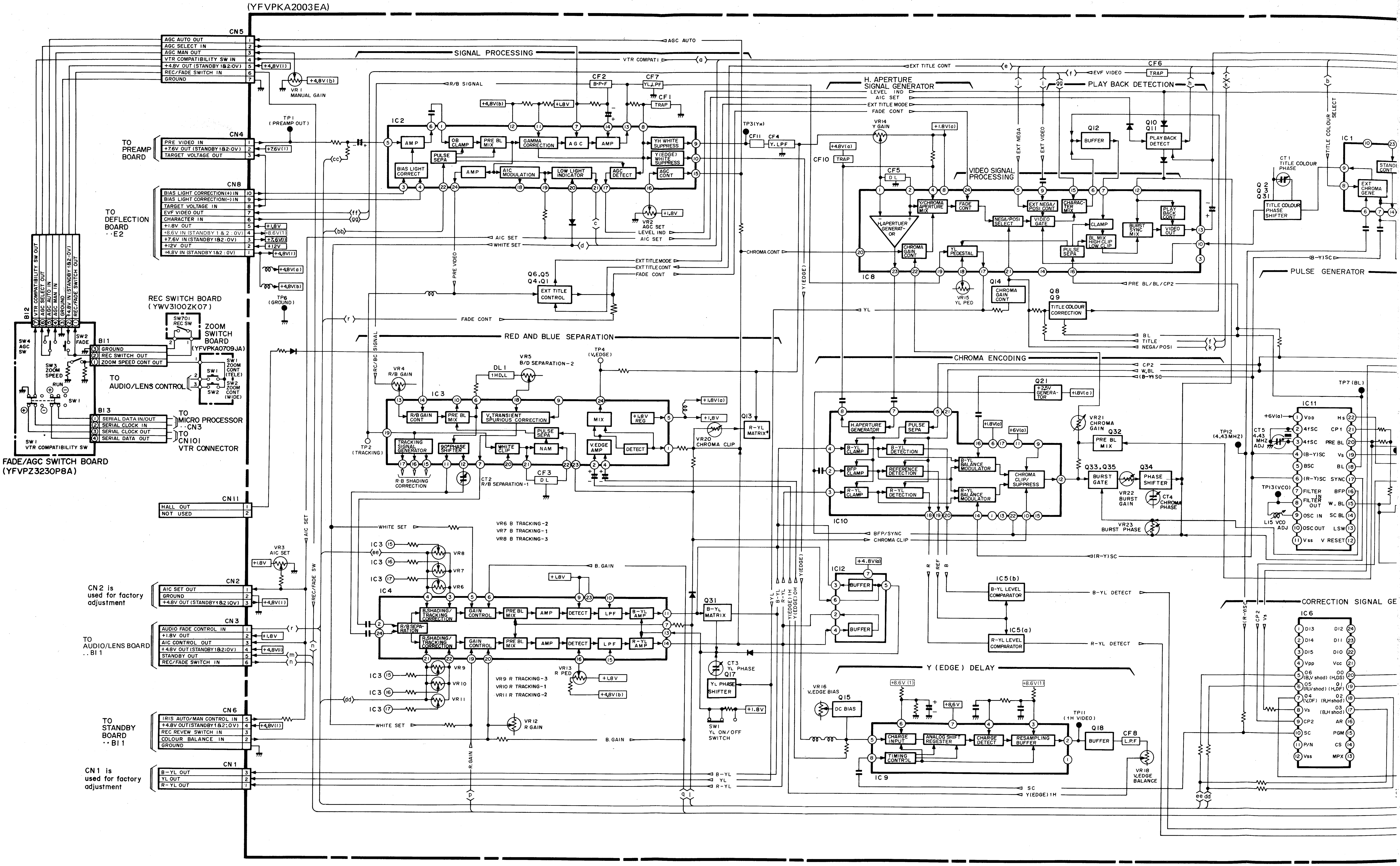
4 +4.8V OUT (STANDBY 2:0V)
5 +4.8V OUT (STANDBY 1 & 2:0V)
6 GROUND
STANDBY BOARD
(YFVAKA0158AN)
CN5
1 AGC AUTO IN
2 AGC SELECT IN
3 AGC MAN IN
4 VTR COMPATIBILITY SW IN
5 +4.8V OUT (STANDBY 1 & 2: 0V)
6 REC/FADE SWITCH IN
7 GROUND
CN6
1 GROUND
2 COLOUR BALANCE IN
3 NOT USED
4 +4.8V OUT (STANDBY 1 & 2:0V)
5 IRIS AUTO/MAN CONTROL IN
CN2
3 +4.8V OUT (STANDBY 1 & 2:0V)
2 GROUND
1 AIC SET OUT
CN002 is used for factory adjustment.
BI1
9 WHITE BALANCE SET SW IN
8 FADE SIGNAL OUT
7 REC/FADE SWITCH OUT
6 REC SIGNAL OUT
5 LOW LIGHT SIGNAL OUT
4 BATTERY WARNING(1) OUT
3 TITLE COLOUR SELECT IN
2 BATTERY WARNING(2) OUT
1 VTR COMPATIBILITY SW OUT
BI3
10 STANDBY IN
9 REC/FADE SWITCH OUT
8 NOT USED
7 RED GAIN CONTROL IN
6 BLUE GAIN CONTROL IN
5 V. PULSE FOR TIMER OUT
4 R-YL DETECTION OUT
3 B-YL DETECTION OUT
2 +1.8V OUT
1 +4.8V OUT (STANDBY 1 & 2: 0V)
BI2
7 REC RESET IN
6 PLAYBACK CONTROL OUT
5 EXT VIDEO IN
4 EXT TITLE POLARITY IN
3 NEG/POS CONTROL IN
2 TITLE COLOUR CORRECTION IN
1 EXT TITLE CONTROL IN
CN8
1 +4.8V IN (STANDBY 1 & 2:0V)
2 +12V OUT
3 +7.6V IN (STANDBY 1 & 2:0V)
4 +8.6V IN (STANDBY 1 & 2:0V)
5 +1.8V OUT
6 CHARACTER IN
7 EVF VIDEO OUT
8 TARGET VOLTAGE IN
9 BIAS LIGHT CORRECTION(–) IN
10 BIAS LIGHT CORRECTION(+) IN
CN7
1 PRE BL OUT
2 HS OUT
3 LEVEL INDICATOR OUT
4 VS OUT
5 DYNAMIC FOCUS OUT
6 NOT USED
CN107
LENS CONNECTOR
1 AIC DRIVE OUT
2 GROUND
3 AIC DAMPER OUT
4 +1.8V OUT
5 +7.6V OUT (P.B:0V)
6 HALL OUT
7 ZOOM CONTROL (TELE) OUT
8 ZOOM CONTROL (WIDE) OUT
9 GROUND (A/F)
10 VS OUT
11 POWER FOCUS OUT
12 NOT USED
REC SWITCH BOARD
(YWV 3100ZK07)
2 GROUND
1 REC SWITCH OUT
ZOOM SWITCH BOARD
(YFVPKA0709JA)
3 ZOOM CONTROL (WIDE) OUT
2 ZOOM CONTROL (TELE) OUT
1 ZOOM SPEED CONTROL IN
INT MIC
CN3
REC/FADE SWITCH IN 6
STANDBY OUT 5
+4.8V OUT (STANDBY 1 & 2: 0V) 4
AIC CONTROL OUT 3
+1.8V OUT 2
AUDIO FADE CONTROL OUT 1
CN4
PRE VIDEO IN 1
+7.6V OUT (STANDBY 1 & 2:0V) 2
TARGET VOLTAGE OUT 3
CN11
1 HALL IN
2 NOT USED
PROCESS BOARD
(YFVPKA2003EA)
CN1
1 R-YL OUT
2 YL OUT
3 B-YL OUT
CN001 is used for factory adjustment.
CN9
1 GROUND
2 VIDEO OUT/P.B VIDEO IN
CN 105
CAMERA REMOTE CONTROL CONNECTOR
EARPHONE BOARD
(YFVAKA0136AN)
3 EARPHONE CH1
2 GROUND
1 EARPHONE CH2
CN1
1 POWER FOCUS OUT
2 +7.6V OUT (P.B: 0V)
3 ZOOM CONTROL (TELE) OUT
4 ZOOM CONTROL (WIDE) OUT
5 GROUND (A/F)
6 +1.8V OUT
7 AIC DRIVE OUT
8 GROUND
9 AIC DAMPER OUT
10 VS OUT
CN2
5 VS OUT
4 POWER FOCUS IN
3 REC/FADE SWITCH IN
2 ZOOM CONTROL (WIDE) IN
1 ZOOM CONTROL (TELE) IN
CN3
1 ZOOM CONTROL (TELE) IN
2 ZOOM CONTROL (WIDE) IN
BI1
1 REC/FADE SWITCH OUT
2 +1.8V IN
3 AIC CONTROL IN
4 STANDBY IN
5 AUDIO FADE CONTROL IN
6 +4.8V IN (STANDBY 1 & 2:0V)
BI2
1 VS IN
2 GROUND
3 +7.6V IN (STANDBY 1 & 2: 0V)
4 +7.6V IN (P.B:0V)
5 BEAM DETECT IN
CN5
3 EXT MIC CH1 (L) IN
2 AUDIO GROUND
1 INT MIC-OUT
CN6
1 AUDIO GROUND
2 INT MIC-IN
CN4
1 AUDIO GROUND
2 EXT MIC CH2 (R) IN
AUDIO/LENS CONTROL BOARD
(YFVPKA2005EA)
A
B
C
D
E
F
G
H
J
K
L
M
N
O
P
Q
R
S
T
V
W
X

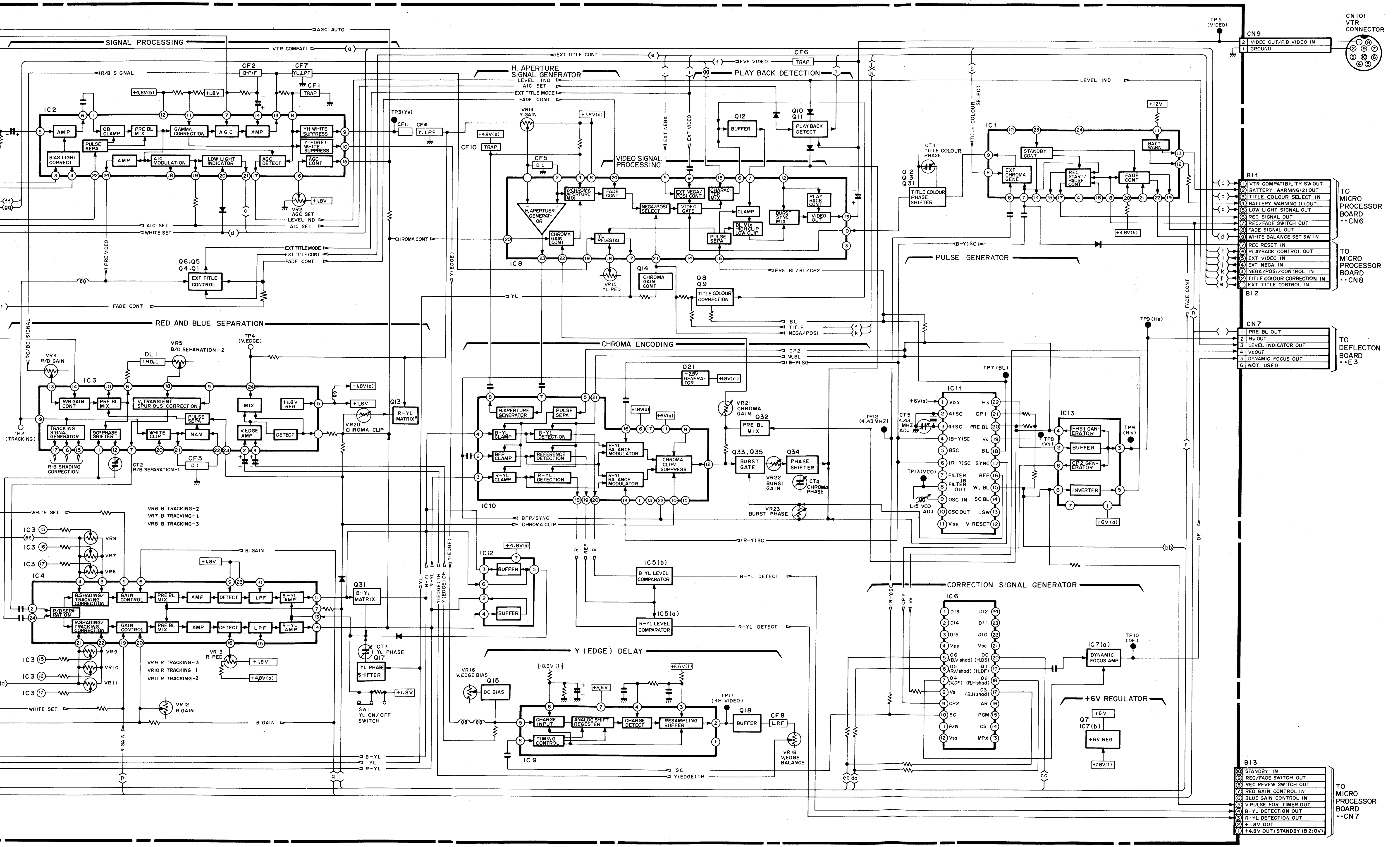
WIRING DIAGRAM


SW1 INDOOR/OUT DOOR SW
SW 2 WHITE SET SW
DISPLAY KEY BOARD [B]
DISPLAY KEY BOARD [A]
E1
1 TITLE PRESET / TAPE MEMORY P60
2 DATE START / TAPE RESET P61
3 DATE SET / DELETE / NEG / POS P62
4 NEG / POS / EXT TITLE P21
5 TITLE / DATE P22
6 LEFT P71
7 INSERT / EXT TITLE / SHIFT P63
8 REV SEQ P73
9 SEQUENCE P72
10 RIGHT P70
11 SHIFT / WORD SELE / TAPE CONT P23
1 TITLE 1-2 / DETE / NORMAL / TIME P20
2 TITLE 1-2 P63
3 REC / PLAY SELECT P71
4 REC / PLAY SELECT P22
5 STOP WATCH START P21
6 TIME P62
7 DATE / STOP WATCH START P61
8 STOP WATCH RESET / PLAY P60
MICRO PROCESSOR BOARD (YFVPKA2004EA)
CN1
CN2
BI1
10 BUCK-UP BATT WARNING IN
9 VDD IN
8 BEAM DETECT IN
7 PLAY BACK CONTROL OUT
6 +5V IN
5 CPU RESET IN
4 +7.6V IN
3 CHARACTER OUT
2 H. SYNC IN
1 V. SYNC IN
CN8
7 NEG/POS CONTROL OUT
6 EXT TITLE POLARITY OUT
5 EXT VIDEO OUT
4 PLAY BACK CONTROL IN
3 REC RESET OUT
2 TITLE COLOUR CORRECTION OUT
1 EXT TITLE OUT
CN3
1 SERIAL DATA IN/OUT
2 SERIAL CLOCK IN
3 VTR REC CONTROL OUT
CN5
GROUND 2
INDOOR/OUTDOOR SW IN 1
CN4
GROUND 2
WHITE SET SW IN 1
CN6
9 WHITE BALANCE SET SW OUT
8 FADE SIGNAL IN
7 REC/FADE SWITCH IN
6 REC SIGNAL IN
5 LOW LIGHT SIGNAL IN
4 BATTERY WARNING(1) IN
3 TITLE COLOUR SELECT OUT
2 BATTERY WARNING(2) IN
1 VTR COMPATIBILITY SWITCH IN
CN7
10 STANDBY OUT
9 REC/FADE SWITCH IN
8 NOT USED
7 RED GAIN CONTROL OUT
6 BLUE GAIN CONTROL OUT
5 V. PULSE FOR TIMER IN
4 B-YL DETECTION IN
3 R-YL DETECTION IN
2 +1.8V IN
1 +4.8V IN (STANDBY 1 & 2:0V)
CPU BACK-UP BATTERY 1.5V SUM-3NG
DEFLECTION BOARD (YFVPKA2001EA)
CN6
BEAM DETECT OUT 10
PLAY BACK CONTROL IN 9
V. SYNC OUT 8
CHARACTER IN 7
H. SYNC OUT 6
VDD OUT 5
CPU RESET OUT 4
BUCK-UP BATT WARNING OUT 3
+5V OUT 2
+7.6V OUT 1
CN2
GROUND 1
+4.8V OUT (STANDBY 1 & 2:0V) 2
EVF VIDEO OUT 3
H.D OUT 4
V. DEF(+) OUT 5
V. DEF(-) OUT 6
+7.6V OUT (STANDBY 2:0V) 7
+4.8V OUT (STANDBY 2:0V) 8
CN4
+1.5V IN 2
GROUND 1
CN1
+7.6V IN (STANDBY 1 & 2:0V) 1
+7.6V IN (STANDBY 2:0V) 2
+7.6V OUT 3
+4.8V OUT (STANDBY 2:0V) 4
+4.8V IN (STANDBY 2:0V) 5
GROUND 6
CN5
GROUND 1
+12V IN 2
CN7
1 BEAM DETECT OUT
2 GROUND
3 +7.6V (P.B. 0V) OUT
4 VS OUT
5 +7.6V OUT (STANDBY 1 & 2:0V)
CN3
1 H. DEF(-) OUT
2 H. DEF(+) OUT
3 NOT USED
4 V. DEF(-) OUT
5 V. DEF(+) OUT
CN8
2 BIAS LIGHT DC OUT
1 NOT USED
BI1
6 GROUND
5 H:+7.6V OUT (STANDBY 1 & 2:0V)
4 K OUT
3 G1 OUT
2 G2 OUT
1 G4 OUT
E2
1 +4.8V OUT (STANDBY 1 & 2:0V)
2 +12V OUT
3 +7.6V OUT (STANDBY 1 & 2:0V)
4 +8.6V OUT (STANDBY 1 & 2:0V)
5 +1.8V IN
6 CHARACTER OUT
7 EVF VIDEO IN
8 TARGET VOLTAGE OUT
9 BIAS LIGHT CORRECTION(-) OUT
10 BIAS LIGHT CORRECTION(+) OUT
E3
1 PRE BL IN
2 H1 IN
3 LEVEL INDICATOR IN
4 VS IN
5 DYNAMIC FOCUS IN
6 NOT USED
G6
G5
L101 DEFLECTION COIL FOR PICK-UP TUBE
PICK-UP TUBE
CN103 PICK-UP TUBE CONNECTOR
BIAS LIGHT ASSEMBLY
GROUND
PREAMPLIFIER BOARD (YFVPKA2002EA)
1 GROUND
2 G4
3 G6
4 G5
5 G2
6 G1
7 K
8 H:+7.6V (STANDBY 1 & 2:0V)
BI1
4 TARGET VOLTAGE IN
3 +7.6V IN (STANDBY 1 & 2: 0V)
2 PRE VIDEO OUT
1 GROUND
PROCESS BOARD (YFVPKA2003EA)
CN6
1 GROUND
2 COLOUR BALANCE IN
3 NOT USED
4 +4.8V OUT (STANDBY 1 & 2:0V)
5 IRIS AUTO/MAN CONTROL IN
CN2
3 +4.8V OUT (STANDBY 1 & 2:0V)
2 GROUND
1 AIC SET OUT
CN002 is used for factory adjustment.
BI3
10 STANDBY IN
9 REC/FADE SWITCH OUT
8 NOT USED
7 RED GAIN CONTROL IN
6 BLUE GAIN CONTROL IN
5 V. PULSE FOR TIMER OUT
4 B-YL DETECTION OUT
3 R-YL DETECTION OUT
2 +1.8V OUT
1 +4.8V OUT (STANDBY 1 & 2:0V)
BI2
7 REC RESET IN
6 PLAYBACK CONTROL OUT
5 EXT VIDEO IN
4 EXT TITLE POLARITY IN
3 NEG/POS CONTROL IN
2 TITLE COLOUR CORRECTION IN
1 EXT TITLE CONTROL IN
CN8
1 +4.8V IN (STANDBY 1 & 2:0V)
2 +12V OUT
3 +7.6V IN (STANDBY 1 & 2:0V)
4 +8.6V IN (STANDBY 1 & 2:0V)
5 +1.8V OUT
6 CHARACTER IN
7 EVF VIDEO OUT
8 TARGET VOLTAGE IN
9 BIAS LIGHT CORRECTION(-) IN
10 BIAS LIGHT CORRECTION(+) IN
CN7
1 PRE BL OUT
2 H1 OUT
3 LEVEL INDICATOR OUT
4 VS OUT
5 DYNAMIC FOCUS OUT
6 NOT USED
CN1
1 R-YL OUT
2 YL OUT
3 B-YL OUT
CN001 is used for factory adjustment.
CN11
1 HALL IN
2 NOT USED
CN9
1 GROUND
2 VIDEO OUT/P.B VIDEO IN
CN 105 CAMERA REMOTE CONTROL CONNECTOR
AUDIO/LENS CONTROL BOARD (YFVPKA2005EA)
CN1
1 POWER FOCUS OUT
2 +7.6V OUT (P.B. 0V)
3 ZOOM CONTROL (TELE) OUT
4 ZOOM CONTROL (WIDE) OUT
5 GROUND (A/F)
6 +1.8V OUT
7 AIC DRIVE OUT
8 GROUND
9 AIC DAMPER IN
10 VS OUT
CN2
5 VS OUT
4 POWER FOCUS IN
3 REC/FADE SWITCH IN
2 ZOOM CONTROL (WIDE) IN
1 ZOOM CONTROL (TELE) IN
CN3
1 ZOOM CONTROL (TELE) IN
2 ZOOM CONTROL (WIDE) IN
BI1
1 REC/FADE SWITCH OUT
2 +1.8V IN
3 AIC CONTROL IN
4 STANDBY IN
5 AUDIO FADE CONTROL IN
6 +4.8V IN (STANDBY 1 & 2: 0V)
BI2
1 VS IN
2 GROUND
3 +7.6V IN (STANDBY 1 & 2: 0V)
4 +7.6V IN (P.B 0V)
5 BEAM DETECT IN
CN5
3 EXT MIC CH1 (L) IN
2 AUDIO GROUND
1 INT MIC-OUT
CN4
1 AUDIO GROUND
2 EXT MIC CH2 (R) IN
CN6
1 AUDIO GROUND
2 INT MIC-IN
EARPHONE BOARD (YFVAKA0136AN)
3 EARPHONE CH1 (L) IN
2 GROUND
1 EARPHONE CH2 (R) IN
CN8
3 EARPHONE CH1 (L) OUT
2 EARPHONE CH2 (R) OUT
1 GROUND
CN007
1 AUDIO GROUND
2 AUDIO CH2 (R) OUT/STANDBY OUT
3 AUDIO CH1 (L) OUT
FADE/AGC SWITCH BOARD (YFVPZ 3230P8A)
BI2
1 VTR COMPATIBILITY SW OUT
2 AGC SELECT OUT
3 AGC AUTO OUT
4 AGC MAN OUT
5 GROUND
6 +4.8V IN (STANDBY 1 & 2: 0V)
7 REC/FADE SWITCH OUT
BI1
3 GROUND
2 REC SWITCH IN
1 ZOOM SPEED CONTROL OUT
BI3
4 SERIAL DATA OUT
3 SERIAL CLOCK OUT
2 SERIAL CLOCK IN
1 SERIAL DATA IN
CN201
VTR REC CONTROL OUT 3
SERIAL CLOCK OUT 2
SERIAL DATA OUT 1
CN101 VTR CONNECTOR
1 VIDEO OUT/PLAY BACK VIDEO IN
2 GROUND FOR PIN ①
3 SERIAL DATA IN/OUT
4 SERIAL CLOCK IN
5 AUDIO CH2 (R) OUT/STANDBY OUT
6 VTR REC CONTROL OUT
7 AUDIO CH1 (L) OUT
8 AUDIO GROUND
9 GROUND
10 +12V IN

BLOCK DIAGRAM OF PROCESS BOARD (YFVPKA2003EA)

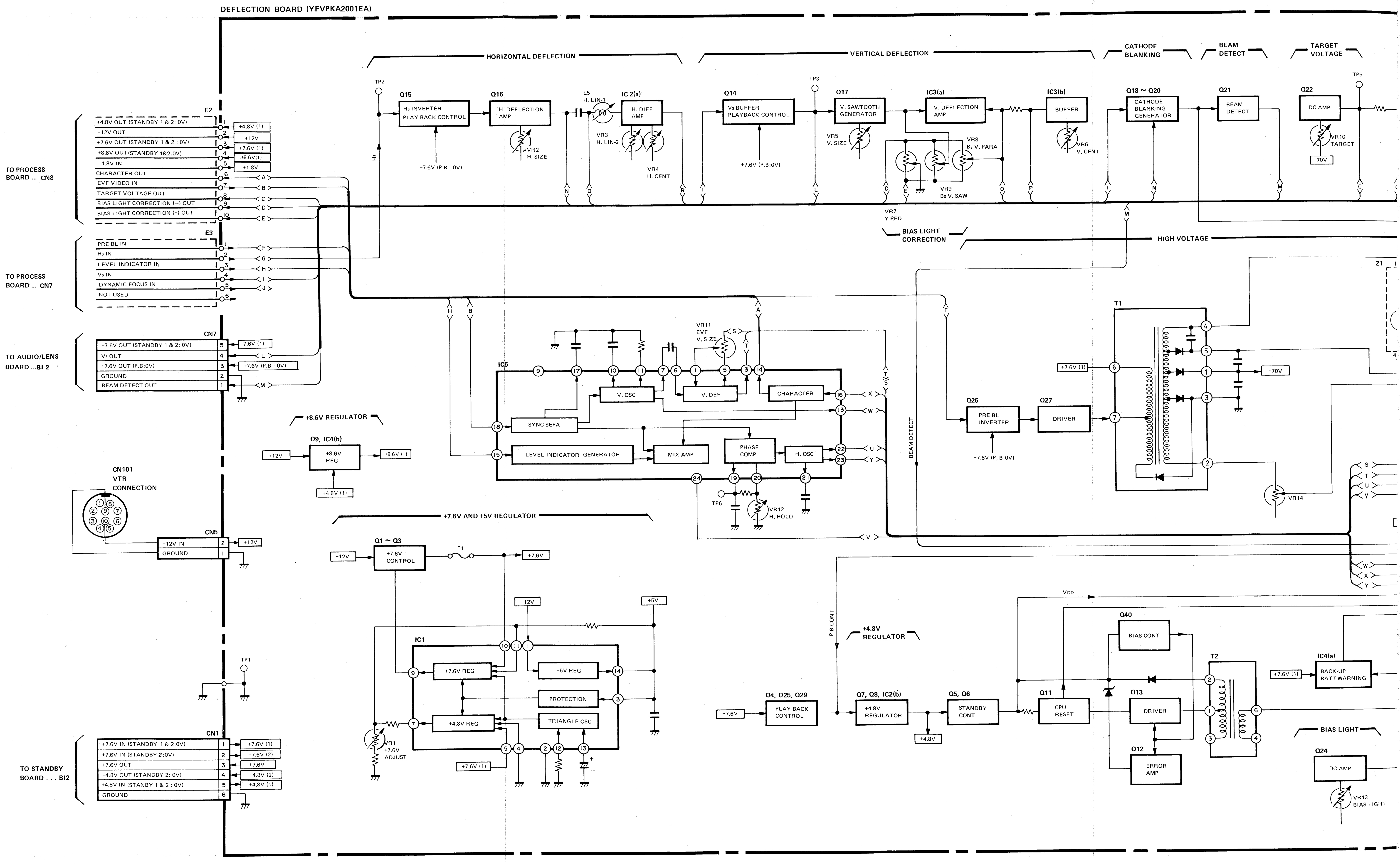

PROCESS BOARD (YFVPKA2003EA)
CN5
AGC AUTO OUT
AGC SELECT IN
AGC MAN OUT
VTR COMPATIBILITY SW IN
+4.8V OUT (STANDBY 1&2:0V)
REC/FADE SWITCH IN
GROUND
VR1 MANUAL GAIN
TO PREAMP BOARD
CN4
PRE VIDEO IN
+7.6V OUT (STANDBY 1&2:0V)
TARGET VOLTAGE OUT
TO DEFLECTION BOARD ··E2
CN8
BIAS LIGHT CORRECTION(+) IN
BIAS LIGHT CORRECTION(−) IN
TARGET VOLTAGE IN
EVF VIDEO OUT
CHARACTER IN
+1.8V OUT
+8.6V IN (STANDBY 1 & 2 : 0V)
+7.6V IN (STANDBY 1&2 : 0V)
+12V OUT
+4.8V IN (STANDBY 1&2 : 0V)
B12
REC SWITCH BOARD (YWV3100ZK07)
SW701 REC SW
ZOOM SWITCH BOARD (YFVPKA0709JA)
B11
GROUND
REC SWITCH OUT
ZOOM SPEED CONT OUT
TO AUDIO/LENS CONTROL
SW1 ZOOM CONT (TELE)
SW2 ZOOM CONT (WIDE)
SW4 AGC SW
SW3 ZOOM SPEED
SW2 FADE
B13
SERIAL DATA IN/OUT
SERIAL CLOCK IN
SERIAL CLOCK OUT
SERIAL DATA OUT
TO MICRO PROCESSOR ··CN3
TO CN101 VTR CONNECTOR
SW1 VTR COMPATIBILITY SW
FADE/AGC SWITCH BOARD (YFVPZ3230P8A)
CN11
HALL OUT
NOT USED
CN2 is used for factory adjustment
CN2
AIC SET OUT
GROUND
+4.8V OUT (STANDBY1&2:0V)
TO AUDIO/LENS BOARD ..B11
CN3
AUDIO FADE CONTROL IN
+1.8V OUT
AIC CONTROL OUT
+4.8V OUT (STANDBY1&2:0V)
STANDBY OUT
REC/FADE SWITCH IN
TO STANDBY BOARD ··B11
CN6
IRIS AUTO/MAN CONTROL IN
+4.8V OUT (STANDBY1&2:0V)
REC REVIEW SWITCH IN
COLOUR BALANCE IN
GROUND
CN1 is used for factory adjustment
CN1
B−YL OUT
YL OUT
R−YL OUT
TP1 (PREAMP OUT)
TP6 (GROUND)
SIGNAL PROCESSING
R/B SIGNAL
VTR COMPATI
CF2 B·P·F
CF7 YL.LPF
CF1 TRAP
IC2
AMP
OB CLAMP
PRE BL MIX
GAMMA CORRECTION
AGC
AMP
YH WHITE SUPPRESS
Y(EDGE) WHITE SUPPRESS
PULSE SEPA
BIAS LIGHT CORRECT
AMP
AIC MODULATION
LOW LIGHT INDICATOR
AGC DETECT
AGC CONT
VR2 AGC SET
LEVEL IND
AIC SET
WHITE SET
PRE VIDEO
Q6,Q5 Q4,Q1
EXT TITLE CONTROL
EXT TITLE MODE
EXT TITLE CONT
FADE CONT
TP3 (YH)
CF11
CF4 Y.LPF
CF10 TRAP
CHROMA CONT
Y(EDGE)
YL
AGC AUTO
EXT TITLE CONT
EVF VIDEO
CF6 TRAP
H. APERTURE SIGNAL GENERATOR
PLAY BACK DETECTION
VR14 Y GAIN
EXT NEGA
EXT VIDEO
Q12 BUFFER
Q10 Q11 PLAY BACK DETECT
VIDEO SIGNAL PROCESSING
CF5 DL
H.APERTUER GENERATOR
Y/CHROMA APERTURE MIX
FADE CONT
NEGA/POSI SELECT
EXT NEGA/POSI CONT
VIDEO GATE
CHARACTER MIX
CLAMP
PULSE SEPA
BL MIX HIGH CLIP LOW CLIP
BURST SYNC MIX
PLAY BACK CONT
VIDEO OUT
CHROMA GAIN CONT
YL PEDESTAL
IC8
VR15 YL PED
Q14 CHROMA GAIN CONT
Q8 Q9 TITLE COLOUR CORRECTION
PRE BL/BL/CP2
BL
TITLE
NEGA/POSI
TITLE COLOUR SELECT
CT1 TITLE COLOUR PHASE
Q2 Q3 Q31
TITLE COLOUR PHASE SHIFTER
IC1
EXT CHROMA GENE
STANDARD CONT
(B−Y)SC
PULSE GENERATOR
RED AND BLUE SEPARATION
RC/BC SIGNAL
VR4 R/B GAIN
DL1 1HDL
VR5 B/D SEPARATION-2
TP4 (V.EDGE)
IC3
R/B GAIN CONT
PRE BL MIX
V.TRANSIENT SPURIOUS CORRECTION
MIX
+1.8V REG
TRACKING SIGNAL GENERATOR
90° PHASE SHIFTER
WHITE CLIP
PULSE SEPA
NAM
V.EDGE AMP
DETECT
R·B SHADING CORRECTION
CT2 R/B SEPARATION-1
CF3 DL
TP2 (TRACKING)
Q13 R−YL MATRIX
VR20 CHROMA CLIP
CHROMA ENCODING
CP2
W.BL
(B−Y)SC
Q21 +2.5V GENERATOR
IC10
H.APERTURE GENERATOR
PULSE SEPA
B−YL CLAMP
B−YL DETECTION
BFP CLAMP
REFERENCE DETECTION
R−YL CLAMP
R−YL DETECTION
B−YL BALANCE MODULATOR
R−YL BALANCE MODULATOR
CHROMA CLIP/SUPPRESS
VR21 CHROMA GAIN
Q32 PRE BL MIX
Q33,Q35 BURST GATE
VR22 BURST GAIN
Q34 PHASE SHIFTER
CT4 CHROMA PHASE
VR23 BURST PHASE
BFP/SYNC
CHROMA CLIP
(R−Y)SC
TP7 (BL)
TP12 (4.43MHZ)
IC11
CT5 4.43 MHZ ADJ
TP13 (VCO)
L15 VCO ADJ
VDD
4fSC
(B−Y)SC
BSC
(R−Y)SC
FILTER IN
FILTER OUT
OSC IN
OSC OUT
Vss
Hs
CP1
PRE BL
Vs
BL
SYNC
BFP
W. BL
SC BL
LSW
V RESET
WHITE SET
VR6 B TRACKING-2
VR7 B TRACKING-1
VR8 B TRACKING-3
IC4
B.SHADING/TRACKING CORRECTION
R/B SEPARATION
R.SHADING/TRACKING CORRECTION
GAIN CONTROL
PRE BL MIX
AMP
DETECT
LPF
B−YL AMP
R−YL AMP
B. GAIN
VR9 R TRACKING-3
VR10 R TRACKING-1
VR11 R TRACKING-2
VR12 R GAIN
VR13 R PED
R. GAIN
AIC SET
VR3 AIC SET
REC/FADE SW
Q31 B−YL MATRIX
CT3 YL PHASE
Q17 YL PHASE SHIFTER
SW1 YL ON/OFF SWITCH
IC12
BUFFER
IC5(b) B−YL LEVEL COMPARATOR
IC5(a) R−YL LEVEL COMPARATOR
B−YL DETECT
R−YL DETECT
Y (EDGE) DELAY
VR16 V.EDGE BIAS
Q15 DC BIAS
IC9
CHARGE INPUT
ANALOG SHIFT REGESTER
CHARGE DETECT
RESAMPLING BUFFER
TIMING CONTROL
TP11 (1H VIDEO)
Q18 BUFFER
CF8 L.P.F
VR18 V.EDGE BALANCE
SC
Y(EDGE)1H
B−YL
YL
R−YL
CORRECTION SIGNAL GE
IC6
D13 D14 D15
Vpp
O6 (B,V shod) (H,DS)
O5 (R,V shod) (H,DF)
O4 (V,DF) (R,H shod)
Vs
CP2
SC
P/N
Vss
D12 D11 D10
Vcc
O0 O1 O2 O3 (B,H shod)
AR
PGM
CS
MPX

BLOCK DIAGRAM OF PROCESS BOARD (YFVPKA2003EA)

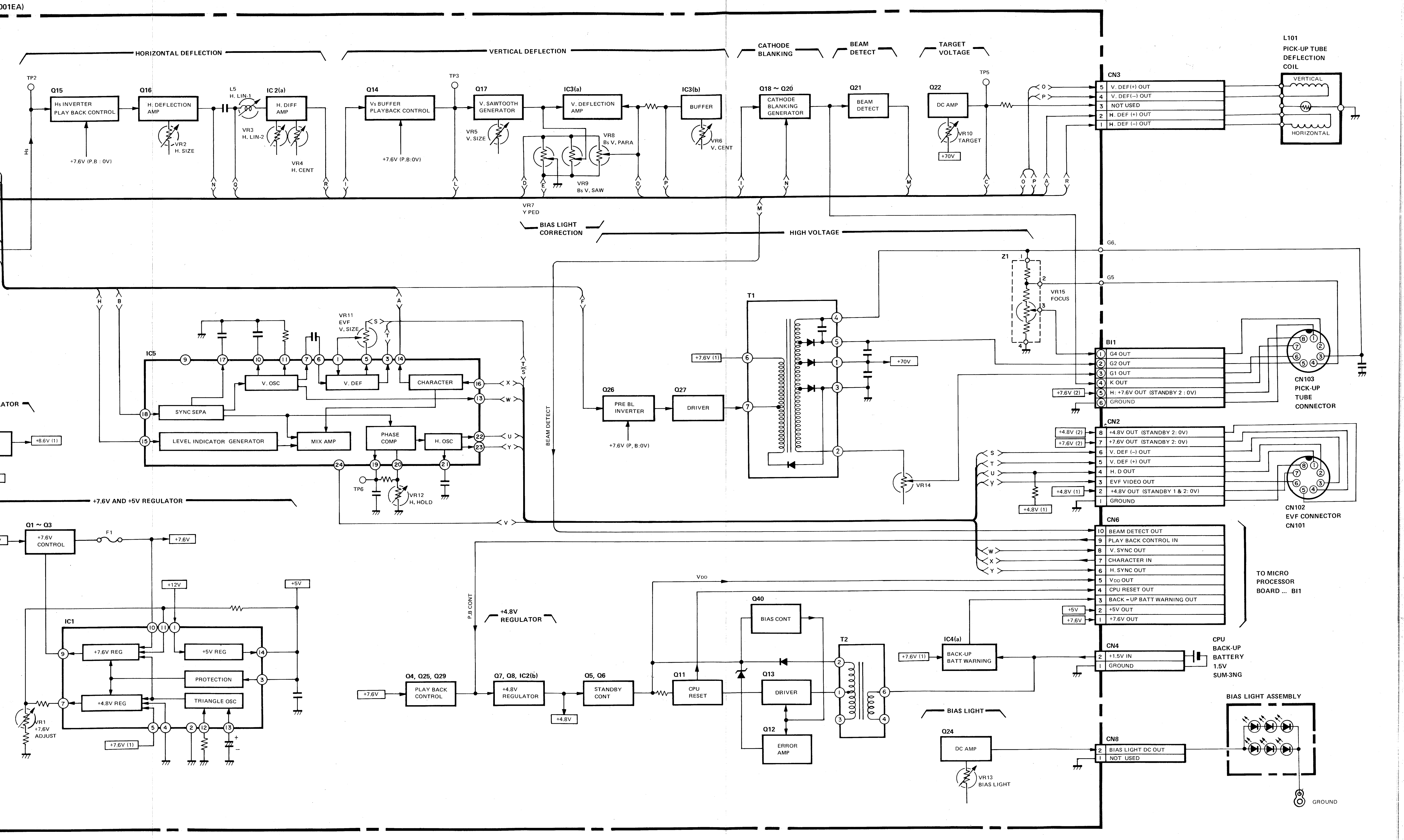


SIGNAL PROCESSING
AGC AUTO
VTR COMPATI
R/B SIGNAL
CF2 B·P·F
CF7 YL.LPF
CF1 TRAP
+4.8V(b)
+1.8V
IC2
AMP
OB CLAMP
PRE BL MIX
GAMMA CORRECTION
AGC
YH WHITE SUPPRESS
Y(EDGE) WHITE SUPPRESS
AGC CONT
PULSE SEPA
BIAS LIGHT CORRECT
AIC MODULATION
LOW LIGHT INDICATOR
AGC DETECT
VR2 AGC SET
LEVEL IND
AIC SET
WHITE SET
PRE VIDEO
Q6,Q5 Q4,Q1
EXT TITLE CONTROL
EXT TITLE MODE
EXT TITLE CONT
FADE CONT
CHROMA CONT
Y(EDGE)
TP3(YH)
CF11
CF4 Y.LPF
CF10 TRAP
+4.8V(a)
H. APERTURE SIGNAL GENERATOR
LEVEL IND
AIC SET
EXT TITLE MODE
VR14 Y GAIN
+1.8V(a)
CF5 D L
VIDEO SIGNAL PROCESSING
H.APERTUER GENERATOR
Y/CHROMA APERTURE MIX
FADE CONT
EXT NEGA/POSI CONT
CHARACTER MIX
NEGA/POSI SELECT
VIDEO GATE
CLAMP
BURST SYNC MIX
PLAY BACK CONT
VIDEO OUT
CHROMA GAIN CONT
YL PEDESTAL
PULSE SEPA
BL MIX HIGH CLIP LOW CLIP
IC8
VR15 YL PED
Q14 CHROMA GAIN CONT
Q8 Q9 TITLE COLOUR CORRECTION
PRE BL/BL/CP2
YL
BL
TITLE
NEGA/POSI
EXT TITLE CONT
EVF VIDEO
CF6 TRAP
PLAY BACK DETECTION
EXT NEGA
EXT VIDEO
Q12 BUFFER
Q10 Q11 PLAY BACK DETECT
TITLE COLOUR SELECT
LEVEL IND
CT1 TITLE COLOUR PHASE
Q2 Q3 Q31
TITLE COLOUR PHASE SHIFTER
IC1
STANDBY CONT
EXT CHROMA GENE
REC START/PAUSE CONT
FADE CONT
BATT WARN
+12V
+4.8V(b)
(B-Y)SC
PULSE GENERATOR
TP5 (VIDEO)
CN9
VIDEO OUT/P.B VIDEO IN
GROUND
CN101 VTR CONNECTOR
B11
VTR COMPATIBILITY SW OUT
BATTERY WARNING(2) OUT
TITLE COLOUR SELECT IN
BATTERY WARNING (1) OUT
LOW LIGHT SIGNAL OUT
REC SIGNAL OUT
REC/FADE SWITCH OUT
FADE SIGNAL OUT
WHITE BALANCE SET SW IN
TO MICRO PROCESSOR BOARD ··CN6
REC RESET IN
PLAYBACK CONTROL OUT
EXT VIDEO IN
EXT NEGA IN
NEGA/POSI/CONTROL IN
TITLE COLOUR CORRECTION IN
EXT TITLE CONTROL IN
B12
TO MICRO PROCESSOR BOARD ··CN8
CN7
PRE BL OUT
Hs OUT
LEVEL INDICATOR OUT
VsOUT
DYNAMIC FOCUS OUT
NOT USED
TO DEFLECTON BOARD ··E3
FADE CONT
DF
RED AND BLUE SEPARATION
RC/BC SIGNAL
VR4 R/B GAIN
VR5 B/D SEPARATION-2
DL1 1HD.L
TP4 (V.EDGE)
IC3
R/B GAIN CONT
PRE BL MIX
V.TRANSIENT SPURIOUS CORRECTION
MIX
+1.8V REG
PULSE SEPA
TRACKING SIGNAL GENERATOR
90°PHASE SHIFTER
WHITE CLIP
NAM
V.EDGE AMP
DETECT
TP2 (TRACKING)
R·B SHADING CORRECTION
CT2 R/B SEPARATION-1
CF3 D L
+1.8V(a)
+1.8V
VR20 CHROMA CLIP
Q13 R-YL MATRIX
CHROMA ENCODING
CP2
W.BL
(B-Y)SC
Q21 +2.5V GENERATOR
+1.8V(a)
H.APERTURE GENERATOR
PULSE SEPA
B-YL CLAMP
B-YL DETECTION
BFP CLAMP
REFERENCE DETECTION
R-YL CLAMP
R-YL DETECTION
B-YL BALANCE MODULATOR
R-YL BALANCE MODULATOR
CHROMA CLIP/SUPPRESS
+1.8V(a)
+6V(a)
IC10
VR21 CHROMA GAIN
Q32 PRE BL MIX
Q33,Q35 BURST GATE
Q34 PHASE SHIFTER
VR22 BURST GAIN
CT4 CHROMA PHASE
VR23 BURST PHASE
BFP/SYNC
CHROMA CLIP
(R-Y)SC
R
REF
B
TP7 (BL)
IC11
+6V(a)
VDD
4fSC
(B-Y)SC
BSC
(R-Y)SC
FILTER
FILTER IN
FILTER OUT
OSC IN
OSC OUT
Vss
Hs
CP1
PRE BL
Vs
BL
SYNC
BFP
W.BL
SC BL
LSW
V RESET
TP12 (4.43MHZ)
CT5 4.43MHZ ADJ
TP13(VCO)
L15 VCO ADJ
IC13
FHS1 GENERATOR
BUFFER
CP2 GENERATOR
INVERTER
TP8 (Vs)
TP9 (Hs)
+6V (d)
WHITE SET
VR6 B TRACKING-2
VR7 B TRACKING-1
VR8 B TRACKING-3
IC3
VR8
VR7
VR6
IC4
B.GAIN
+1.8V
B.SHADING/TRACKING CORRECTION
R/B SEPARATION
R.SHADING/TRACKING CORRECTION
GAIN CONTROL
PRE BL MIX
AMP
DETECT
LPF
B-YL AMP
R-YL AMP
VR9
VR10
VR11
VR9 R TRACKING-3
VR10 R TRACKING-1
VR11 R TRACKING-2
VR13 R PED
+1.8V
+4.8V(b)
VR12 R GAIN
B.GAIN
R.GAIN
Q31 B-YL MATRIX
CT3 YL PHASE
Q17 YL PHASE SHIFTER
+1.8V
SW1 YL ON/OFF SWITCH
YL
B-YL
R-YL
Y(EDGE)1H
Y(EDGE)0H
IC12
+4.8V(a)
BUFFER
IC5(b) B-YL LEVEL COMPARATOR
B-YL DETECT
IC5(a) R-YL LEVEL COMPARATOR
R-YL DETECT
Y (EDGE) DELAY
VR16 V.EDGE BIAS
Q15 DC BIAS
+8.6V(1)
+8.6V
CHARGE INPUT
ANALOG SHIFT REGESTER
CHARGE DETECT
RESAMPLING BUFFER
TIMING CONTROL
IC9
TP11 (1H VIDEO)
Q18 BUFFER
CF8 L.P.F
VR18 V.EDGE BALANCE
SC
Y(EDGE)1H
B-YL
YL
R-YL
CORRECTION SIGNAL GENERATOR
IC6
D13
D14
D15
Vpp
06 (B,V shad)
05 (R,V shad)
04 (V,DF)
Vs
CP2
SC
P/N
Vss
D12
D11
D10
Vcc
00 (H,DS)
01 (H,DF)
02 (R,H shad)
03 (B,H shad)
AR
PGM
CS
MPX
(R-Y)SC
CP2
Vs
IC7(a) DYNAMIC FOCUS AMP
TP10 (DF)
+6V REGULATOR
Q7 IC7(b)
+6V
+6V REG
+7.6V(1)
B13
STANDBY IN
REC/FADE SWITCH OUT
REC REVEW SWITCH OUT
RED GAIN CONTROL IN
BLUE GAIN CONTROL IN
V.PULSE FOR TIMER OUT
B-YL DETECTION OUT
R-YL DETECTION OUT
+1.8V OUT
+4.8V OUT (STANDBY 1&2:0V)
TO MICRO PROCESSOR BOARD ··CN7

BLOCK DIAGRAM OF DEFLECTION BOARD (YFVPKA2001EA)

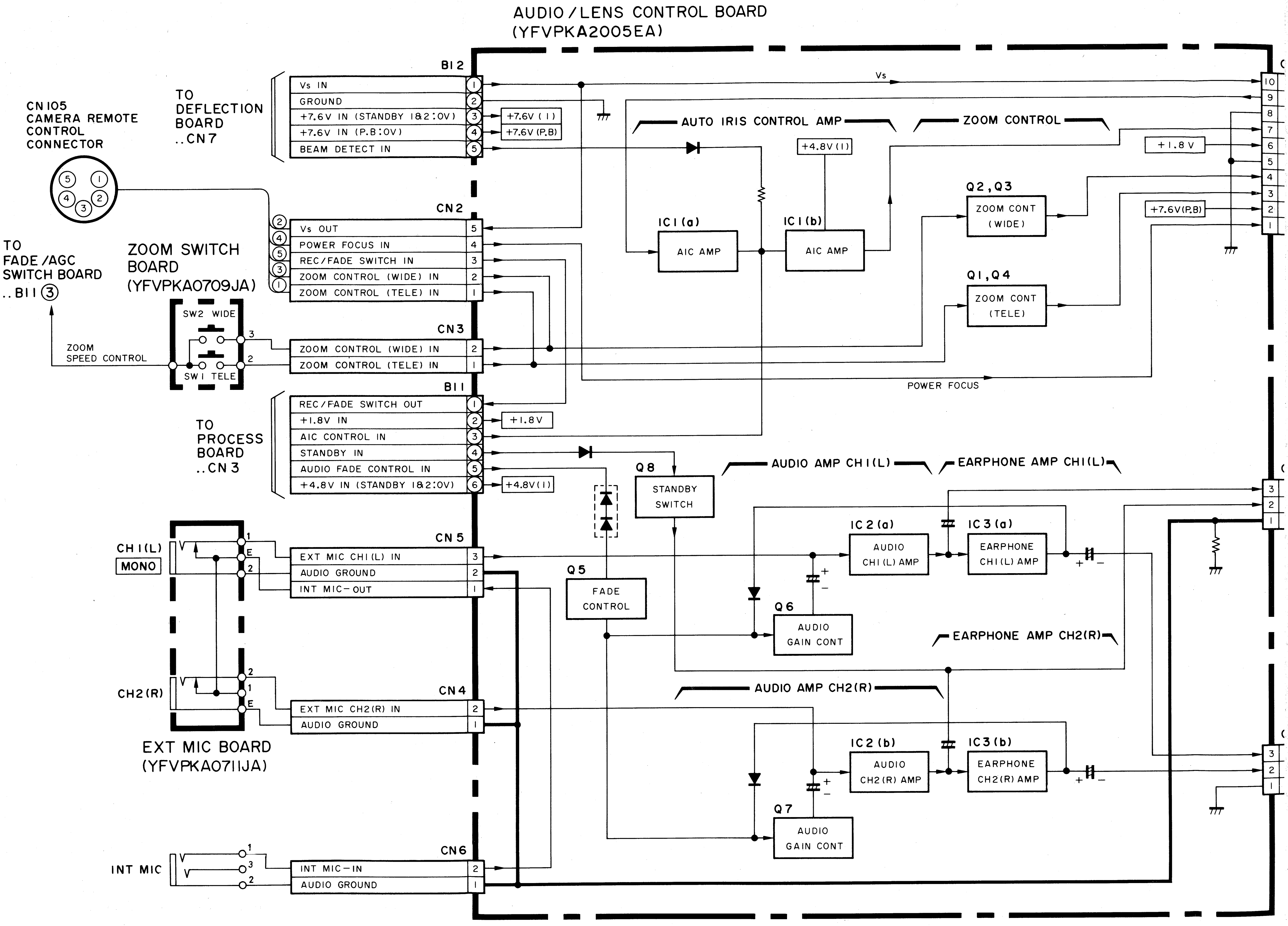

DEFLECTION BOARD (YFVPKA2001EA)
HORIZONTAL DEFLECTION
VERTICAL DEFLECTION
CATHODE BLANKING
BEAM DETECT
TARGET VOLTAGE
TP2
Q15
Hs INVERTER PLAY BACK CONTROL
Hs
+7.6V (P.B : 0V)
Q16
H. DEFLECTION AMP
VR2 H. SIZE
L5 H. LIN-1
IC 2(a)
H. DIFF AMP
VR3 H. LIN-2
VR4 H. CENT
Q14
Vs BUFFER PLAYBACK CONTROL
+7.6V (P.B:0V)
TP3
Q17
V. SAWTOOTH GENERATOR
VR5 V. SIZE
IC3(a)
V. DEFLECTION AMP
VR8 Bs V. PARA
VR9 Bs V. SAW
VR7 Y PED
IC3(b)
BUFFER
VR6 V. CENT
Q18 ~ Q20
CATHODE BLANKING GENERATOR
Q21
BEAM DETECT
Q22
DC AMP
VR10 TARGET
+70V
TP5
BIAS LIGHT CORRECTION
HIGH VOLTAGE
E2
TO PROCESS BOARD ... CN8
+4.8V OUT (STANDBY 1 & 2: 0V)
+12V OUT
+7.6V OUT (STANDBY 1 & 2 : 0V)
+8.6V OUT (STANDBY 1&2:0V)
+1.8V IN
CHARACTER OUT
EVF VIDEO IN
TARGET VOLTAGE OUT
BIAS LIGHT CORRECTION (–) OUT
BIAS LIGHT CORRECTION (+) OUT
+4.8V (1)
+12V
+7.6V (1)
+8.6V (1)
+1.8V
E3
TO PROCESS BOARD ... CN7
PRE BL IN
Hs IN
LEVEL INDICATOR IN
Vs IN
DYNAMIC FOCUS IN
NOT USED
CN7
TO AUDIO/LENS BOARD ...BI 2
+7.6V OUT (STANDBY 1 & 2: 0V)
Vs OUT
+7.6V OUT (P.B:0V)
GROUND
BEAM DETECT OUT
7.6V (1)
+7.6V (P.B : 0V)
IC5
VR11 EVF V. SIZE
V. OSC
V. DEF
CHARACTER
SYNC SEPA
LEVEL INDICATOR GENERATOR
MIX AMP
PHASE COMP
H. OSC
TP6
VR12 H. HOLD
+8.6V REGULATOR
Q9, IC4(b)
+8.6V REG
+12V
+8.6V (1)
+4.8V (1)
CN101 VTR CONNECTION
CN5
+12V IN
GROUND
+12V
+7.6V AND +5V REGULATOR
Q1 ~ Q3
+7.6V CONTROL
F1
+7.6V
+5V
IC1
+7.6V REG
+5V REG
PROTECTION
+4.8V REG
TRIANGLE OSC
VR1 +7.6V ADJUST
+7.6V (1)
TP1
CN1
TO STANDBY BOARD . . . BI2
+7.6V IN (STANDBY 1 & 2:0V)
+7.6V IN (STANDBY 2:0V)
+7.6V OUT
+4.8V OUT (STANDBY 2: 0V)
+4.8V IN (STANBY 1 & 2 : 0V)
GROUND
+7.6V (1)
+7.6V (2)
+7.6V
+4.8V (2)
+4.8V (1)
BEAM DETECT
Q26
PRE BL INVERTER
+7.6V (P, B:0V)
Q27
DRIVER
T1
+7.6V (1)
+70V
VR14
Z1
P.B CONT
+4.8V REGULATOR
Q4, Q25, Q29
PLAY BACK CONTROL
+7.6V
Q7, Q8, IC2(b)
+4.8V REGULATOR
+4.8V
Q5, Q6
STANDBY CONT
VDD
Q11
CPU RESET
Q40
BIAS CONT
Q13
DRIVER
Q12
ERROR AMP
T2
IC4(a)
BACK-UP BATT WARNING
+7.6V (1)
BIAS LIGHT
Q24
DC AMP
VR13 BIAS LIGHT

BLOCK DIAGRAM OF DEFLECTION BOARD (YFVPKA2001EA)

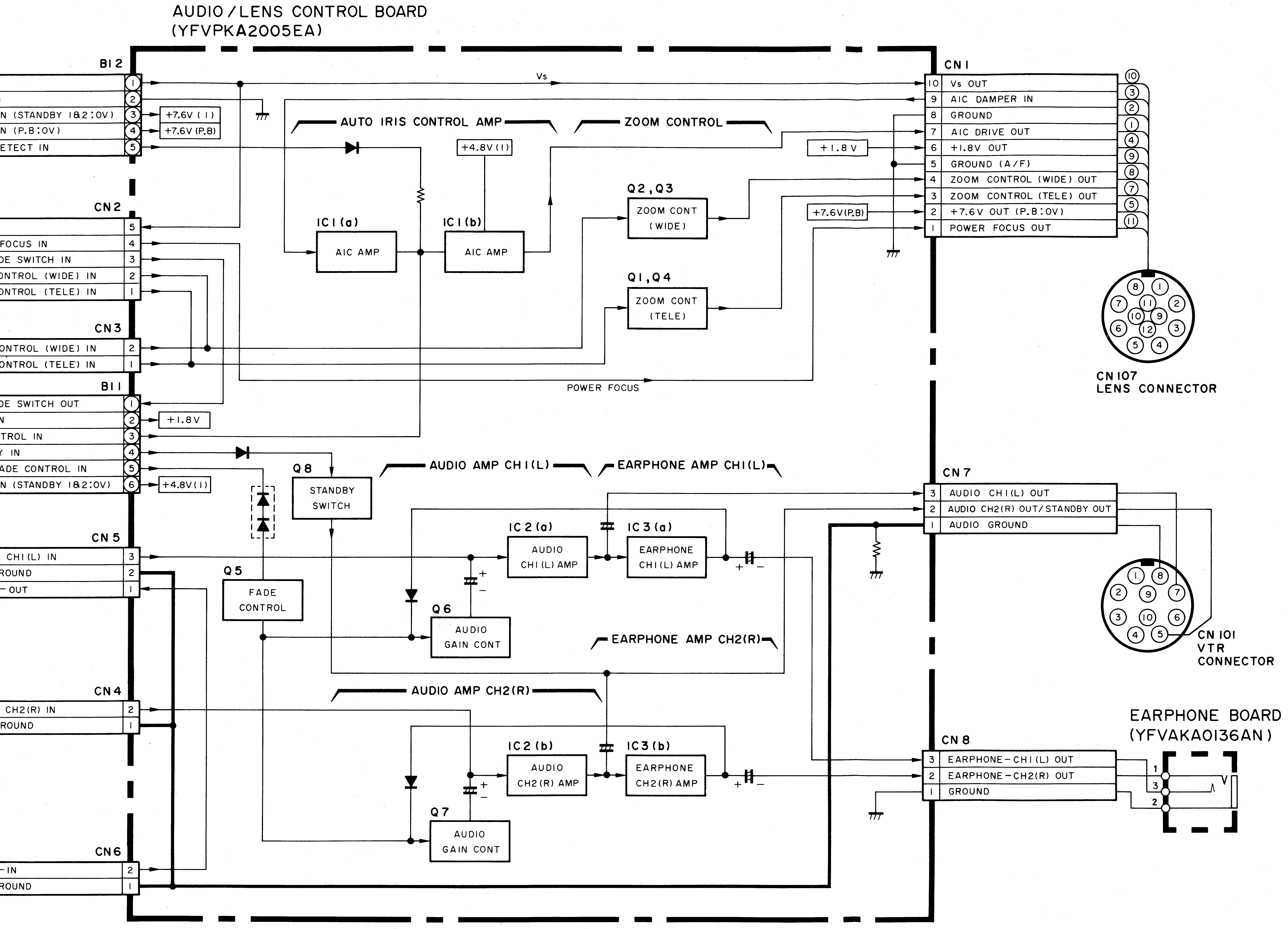


001EA)
HORIZONTAL DEFLECTION
VERTICAL DEFLECTION
CATHODE BLANKING
BEAM DETECT
TARGET VOLTAGE
TP2
Q15
HS INVERTER PLAY BACK CONTROL
+7.6V (P.B : 0V)
HS
Q16
H. DEFLECTION AMP
VR2 H. SIZE
L5 H. LIN-1
IC 2(a)
H. DIFF AMP
VR3 H. LIN-2
VR4 H. CENT
Q14
VS BUFFER PLAYBACK CONTROL
+7.6V (P.B:0V)
TP3
Q17
V. SAWTOOTH GENERATOR
VR5 V. SIZE
IC3(a)
V. DEFLECTION AMP
VR8 BS V. PARA
VR9 BS V. SAW
VR7 Y PED
IC3(b)
BUFFER
VR6 V. CENT
Q18 ~ Q20
CATHODE BLANKING GENERATOR
Q21
BEAM DETECT
Q22
DC AMP
VR10 TARGET
+70V
TP5
N
Q
R
I
L
D
E
O
P
M
C
A
BIAS LIGHT CORRECTION
HIGH VOLTAGE
L101
PICK-UP TUBE DEFLECTION COIL
VERTICAL
HORIZONTAL
CN3
5 V. DEF(+) OUT
4 V. DEF(–) OUT
3 NOT USED
2 H. DEF (+) OUT
1 H. DEF (–) OUT
G6,
G5
Z1
VR15 FOCUS
H
B
F
S
T
VR11 EVF V. SIZE
IC5
V. OSC
V. DEF
CHARACTER
SYNC SEPA
LEVEL INDICATOR GENERATOR
MIX AMP
PHASE COMP
H. OSC
X
W
U
Y
V
TP6
VR12 H. HOLD
LATOR
+8.6V (1)
BEAM DETECT
Q26
PRE BL INVERTER
+7.6V (P, B:0V)
Q27
DRIVER
T1
+7.6V (1)
+70V
VR14
BI1
1 G4 OUT
2 G2 OUT
3 G1 OUT
4 K OUT
5 H: +7.6V OUT (STANDBY 2 : 0V)
6 GROUND
+7.6V (2)
CN103 PICK-UP TUBE CONNECTOR
CN2
8 +4.8V OUT (STANDBY 2: 0V)
7 +7.6V OUT (STANDBY 2: 0V)
6 V. DEF (–) OUT
5 V. DEF (+) OUT
4 H. D OUT
3 EVF VIDEO OUT
2 +4.8V OUT (STANDBY 1 & 2: 0V)
1 GROUND
+4.8V (2)
+7.6V (2)
+4.8V (1)
CN102 EVF CONNECTOR CN101
CN6
10 BEAM DETECT OUT
9 PLAY BACK CONTROL IN
8 V. SYNC OUT
7 CHARACTER IN
6 H. SYNC OUT
5 VDD OUT
4 CPU RESET OUT
3 BACK-UP BATT WARNING OUT
2 +5V OUT
1 +7.6V OUT
+5V
+7.6V
TO MICRO PROCESSOR BOARD ... BI1
+7.6V AND +5V REGULATOR
Q1 ~ Q3
+7.6V CONTROL
F1
+7.6V
+12V
+5V
IC1
+7.6V REG
+5V REG
PROTECTION
+4.8V REG
TRIANGLE OSC
VR1 +7.6V ADJUST
+7.6V (1)
P.B CONT
+4.8V REGULATOR
+7.6V
Q4, Q25, Q29
PLAY BACK CONTROL
Q7, Q8, IC2(b)
+4.8V REGULATOR
+4.8V
Q5, Q6
STANDBY CONT
VDD
Q40
BIAS CONT
Q11
CPU RESET
Q13
DRIVER
Q12
ERROR AMP
T2
IC4(a)
BACK-UP BATT WARNING
+7.6V (1)
CN4
2 +1.5V IN
1 GROUND
CPU BACK-UP BATTERY 1.5V SUM-3NG
BIAS LIGHT
Q24
DC AMP
VR13 BIAS LIGHT
CN8
2 BIAS LIGHT DC OUT
1 NOT USED
BIAS LIGHT ASSEMBLY
GROUND

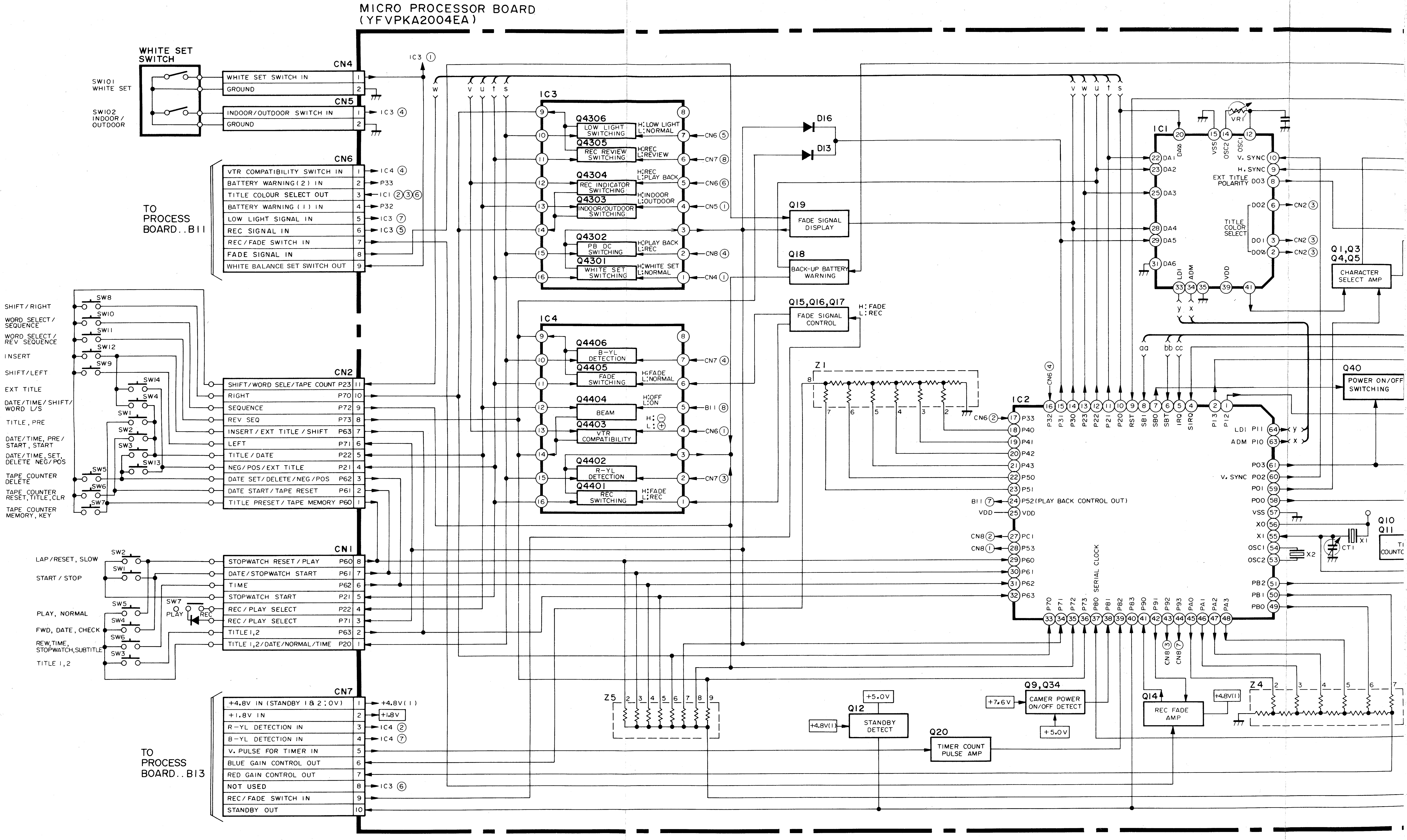
BLOCK DIAGRAM OF AUDIO/LENS CONTROL BOARD (YFVPKA2005EA)


AUDIO / LENS CONTROL BOARD
(YFVPKA2005EA)
CN105
CAMERA REMOTE
CONTROL
CONNECTOR
TO
DEFLECTION
BOARD
..CN7
B12
Vs IN
GROUND
+7.6V IN (STANDBY 1&2:0V)
+7.6V IN (P.B:0V)
BEAM DETECT IN
+7.6V (1)
+7.6V (P.B)
Vs
AUTO IRIS CONTROL AMP
ZOOM CONTROL
+4.8V (1)
+1.8V
+7.6V(P.B)
IC1 (a)
AIC AMP
IC1 (b)
AIC AMP
Q2,Q3
ZOOM CONT
(WIDE)
Q1,Q4
ZOOM CONT
(TELE)
CN2
Vs OUT
POWER FOCUS IN
REC/FADE SWITCH IN
ZOOM CONTROL (WIDE) IN
ZOOM CONTROL (TELE) IN
TO
FADE/AGC
SWITCH BOARD
..B11 ③
ZOOM SWITCH
BOARD
(YFVPKA0709JA)
SW2 WIDE
SW1 TELE
ZOOM
SPEED CONTROL
CN3
ZOOM CONTROL (WIDE) IN
ZOOM CONTROL (TELE) IN
POWER FOCUS
B11
TO
PROCESS
BOARD
..CN3
REC/FADE SWITCH OUT
+1.8V IN
AIC CONTROL IN
STANDBY IN
AUDIO FADE CONTROL IN
+4.8V IN (STANDBY 1&2:0V)
+1.8V
+4.8V(1)
Q8
STANDBY
SWITCH
AUDIO AMP CH1(L)
EARPHONE AMP CH1(L)
CH1(L)
MONO
CN5
EXT MIC CH1(L) IN
AUDIO GROUND
INT MIC-OUT
Q5
FADE
CONTROL
IC2 (a)
AUDIO
CH1(L) AMP
IC3 (a)
EARPHONE
CH1(L) AMP
Q6
AUDIO
GAIN CONT
EARPHONE AMP CH2(R)
AUDIO AMP CH2(R)
CH2(R)
CN4
EXT MIC CH2(R) IN
AUDIO GROUND
EXT MIC BOARD
(YFVPKA0711JA)
IC2 (b)
AUDIO
CH2(R) AMP
IC3 (b)
EARPHONE
CH2(R) AMP
Q7
AUDIO
GAIN CONT
INT MIC
CN6
INT MIC-IN
AUDIO GROUND

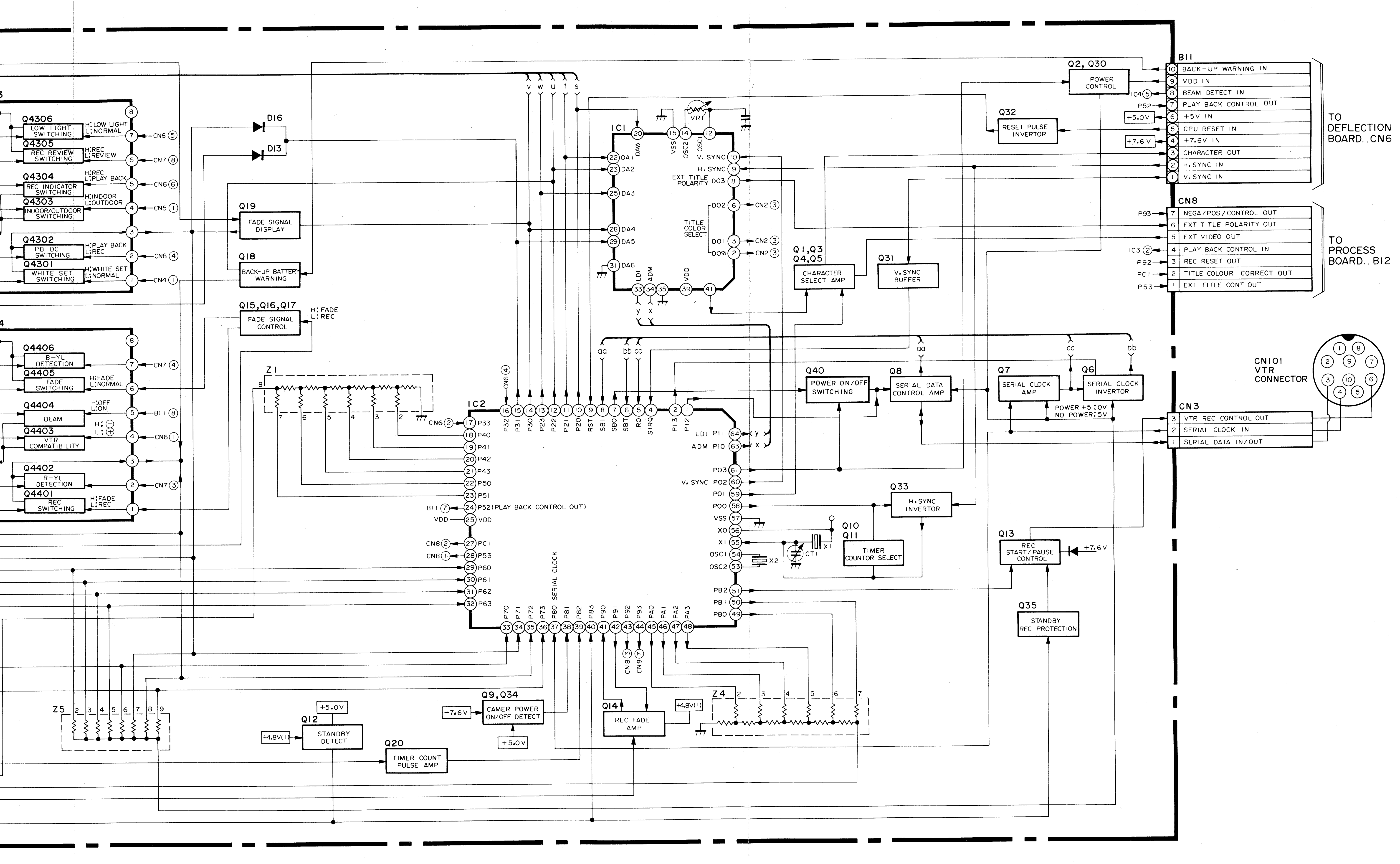
BLOCK DIAGRAM OF AUDIO/LENS CONTROL BOARD (YFVPKA2005EA)


AUDIO / LENS CONTROL BOARD
(YFVPKA2005EA)
B12
N (STANDBY 1&2:0V)
N (P.B:0V)
ETECT IN
+7.6V (I)
+7.6V (P.B)
Vs
AUTO IRIS CONTROL AMP
ZOOM CONTROL
+4.8V (I)
+1.8 V
CN 2
FOCUS IN
DE SWITCH IN
ONTROL (WIDE) IN
ONTROL (TELE) IN
IC1 (a)
AIC AMP
IC1 (b)
AIC AMP
Q2, Q3
ZOOM CONT (WIDE)
Q1, Q4
ZOOM CONT (TELE)
+7.6V (P.B)
CN 3
ONTROL (WIDE) IN
ONTROL (TELE) IN
B11
DE SWITCH OUT
N
TROL IN
Y IN
ADE CONTROL IN
N (STANDBY 1&2:0V)
+1.8V
+4.8V (I)
POWER FOCUS
CN 1
10 Vs OUT
9 AIC DAMPER IN
8 GROUND
7 AIC DRIVE OUT
6 +1.8V OUT
5 GROUND (A/F)
4 ZOOM CONTROL (WIDE) OUT
3 ZOOM CONTROL (TELE) OUT
2 +7.6V OUT (P.B:0V)
1 POWER FOCUS OUT
CN 107
LENS CONNECTOR
Q8
STANDBY SWITCH
AUDIO AMP CH1(L)
EARPHONE AMP CH1(L)
IC2 (a)
AUDIO CH1(L) AMP
IC3 (a)
EARPHONE CH1(L) AMP
CN 5
CH1(L) IN
ROUND
– OUT
Q5
FADE CONTROL
Q6
AUDIO GAIN CONT
EARPHONE AMP CH2(R)
AUDIO AMP CH2(R)
CN 4
CH2(R) IN
ROUND
IC2 (b)
AUDIO CH2(R) AMP
IC3 (b)
EARPHONE CH2(R) AMP
Q7
AUDIO GAIN CONT
CN 6
– IN
ROUND
CN 7
3 AUDIO CH1(L) OUT
2 AUDIO CH2(R) OUT/STANDBY OUT
1 AUDIO GROUND
CN 101
VTR CONNECTOR
EARPHONE BOARD
(YFVAKA0136AN)
CN 8
3 EARPHONE-CH1(L) OUT
2 EARPHONE-CH2(R) OUT
1 GROUND

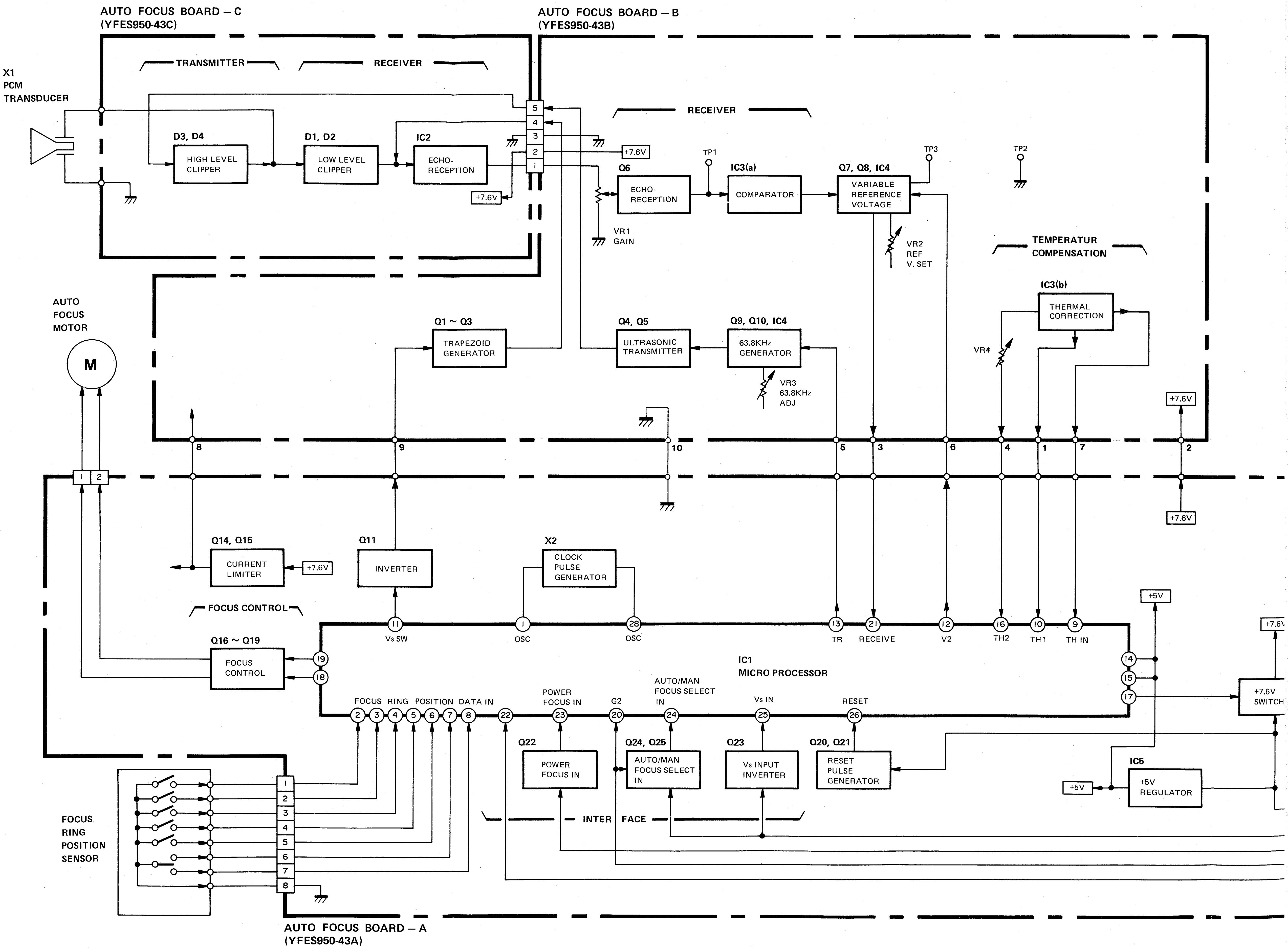
BLOCK DIAGRAM OF MICRO PROCESSOR BOARD (YFVPKA2004EA)


MICRO PROCESSOR BOARD
(YFVPKA2004EA)
WHITE SET SWITCH
SW101 WHITE SET
SW102 INDOOR/OUTDOOR
CN4
WHITE SET SWITCH IN 1
GROUND 2
CN5
INDOOR/OUTDOOR SWITCH IN 1
GROUND 2
CN6
VTR COMPATIBILITY SWITCH IN 1
BATTERY WARNING(2) IN 2
TITLE COLOUR SELECT OUT 3
BATTERY WARNING(1) IN 4
LOW LIGHT SIGNAL IN 5
REC SIGNAL IN 6
REC/FADE SWITCH IN 7
FADE SIGNAL IN 8
WHITE BALANCE SET SWITCH OUT 9
TO PROCESS BOARD..B11
IC3 ①
IC3 ④
IC4 ④
P33
IC1 ②③⑥
P32
IC3 ⑦
IC3 ⑤
SHIFT/RIGHT
WORD SELECT/SEQUENCE
WORD SELECT/REV SEQUENCE
INSERT
SHIFT/LEFT
EXT TITLE
DATE/TIME/SHIFT/WORD L/S
TITLE, PRE
DATE/TIME, PRE/START, START
DATE/TIME, SET, DELETE NEG/POS
TAPE COUNTER DELETE
TAPE COUNTER RESET, TITLE, CLR
TAPE COUNTER MEMORY, KEY
SW8 SW10 SW11 SW12 SW9 SW14 SW4 SW1 SW2 SW3 SW13 SW5 SW6 SW7
CN2
SHIFT/WORD SELE/TAPE COUNT P23 11
RIGHT P70 10
SEQUENCE P72 9
REV SEQ P73 8
INSERT/EXT TITLE/SHIFT P63 7
LEFT P71 6
TITLE/DATE P22 5
NEG/POS/EXT TITLE P21 4
DATE SET/DELETE/NEG/POS P62 3
DATE START/TAPE RESET P61 2
TITLE PRESET/TAPE MEMORY P60 1
LAP/RESET, SLOW
START/STOP
PLAY, NORMAL
FWD, DATE, CHECK
REW, TIME, STOPWATCH, SUBTITLE
TITLE 1,2
SW2 SW1 SW5 SW4 SW6 SW3
SW7 PLAY REC
CN1
STOPWATCH RESET/PLAY P60 8
DATE/STOPWATCH START P61 7
TIME P62 6
STOPWATCH START P21 5
REC/PLAY SELECT P22 4
REC/PLAY SELECT P71 3
TITLE 1,2 P63 2
TITLE 1,2/DATE/NORMAL/TIME P20 1
CN7
+4.8V IN (STANDBY 1&2: 0V) 1
+1.8V IN 2
R-YL DETECTION IN 3
B-YL DETECTION IN 4
V. PULSE FOR TIMER IN 5
BLUE GAIN CONTROL OUT 6
RED GAIN CONTROL OUT 7
NOT USED 8
REC/FADE SWITCH IN 9
STANDBY OUT 10
+4.8V(1)
+1.8V
IC4 ②
IC4 ⑦
IC3 ⑥
TO PROCESS BOARD..B13
w v u t s
IC3
Q4306 LOW LIGHT SWITCHING H: LOW LIGHT L: NORMAL
Q4305 REC REVIEW SWITCHING H: REC L: REVIEW
Q4304 REC INDICATOR SWITCHING H: REC L: PLAY BACK
Q4303 INDOOR/OUTDOOR SWITCHING H: INDOOR L: OUTDOOR
Q4302 PB DC SWITCHING H: PLAY BACK L: REC
Q4301 WHITE SET SWITCHING H: WHITE SET L: NORMAL
CN6 ⑤ CN7 ⑧ CN6 ⑥ CN5 ① CN8 ④ CN4 ①
IC4
Q4406 B-YL DETECTION
Q4405 FADE SWITCHING H: FADE L: NORMAL
Q4404 BEAM H: OFF L: ON H: ⊖ L: ⊕
Q4403 VTR COMPATIBILITY
Q4402 R-YL DETECTION
Q4401 REC SWITCHING H: FADE L: REC
CN7 ④ B11 ⑧ CN6 ① CN7 ③
D16 D13
Q19 FADE SIGNAL DISPLAY
Q18 BACK-UP BATTERY WARNING
Q15, Q16, Q17 FADE SIGNAL CONTROL H: FADE L: REC
Z1
Z5
+5.0V
Q12 STANDBY DETECT
+4.8V(1)
Q20 TIMER COUNT PULSE AMP
Q9, Q34 CAMER POWER ON/OFF DETECT
+7.6V
+5.0V
Q14 REC FADE AMP
+4.8V(1)
Z4
IC1
DA0 VSS OSC2 OSC1 VR1
DA1 DA2 DA3 DA4 DA5 DA6
V. SYNC H. SYNC
EXT TITLE POLARITY DO3
TITLE COLOR SELECT DO2 DO1 DO0
CN2 ③
LDI ADM VDD
y x
Q1, Q3 Q4, Q5 CHARACTER SELECT AMP
aa bb cc
IC2
CN6 ④
P32 P31 P30 P23 P22 P21 P20 RST SB1 SB0 SBT IRQ SIRQ P13 P12
CN6 ② P33
P40 P41 P42 P43 P50 P51
B11 ⑦ P52 (PLAY BACK CONTROL OUT)
VDD
CN8 ② PC1
CN8 ① P53
P60 P61 P62 P63
LDI P11
ADM P10
P03
V. SYNC P02
P01 P00 VSS X0 X1 OSC1 OSC2
PB2 PB1 PB0
X1 X2 CT1
P70 P71 P72 P73 P80 P81 P82 P83 P90 P91 P92 P93 PA0 PA1 PA2 PA3
SERIAL CLOCK
CN8 ③ CN8 ⑦
Q40 POWER ON/OFF SWITCHING
Q10 Q11
COUNT

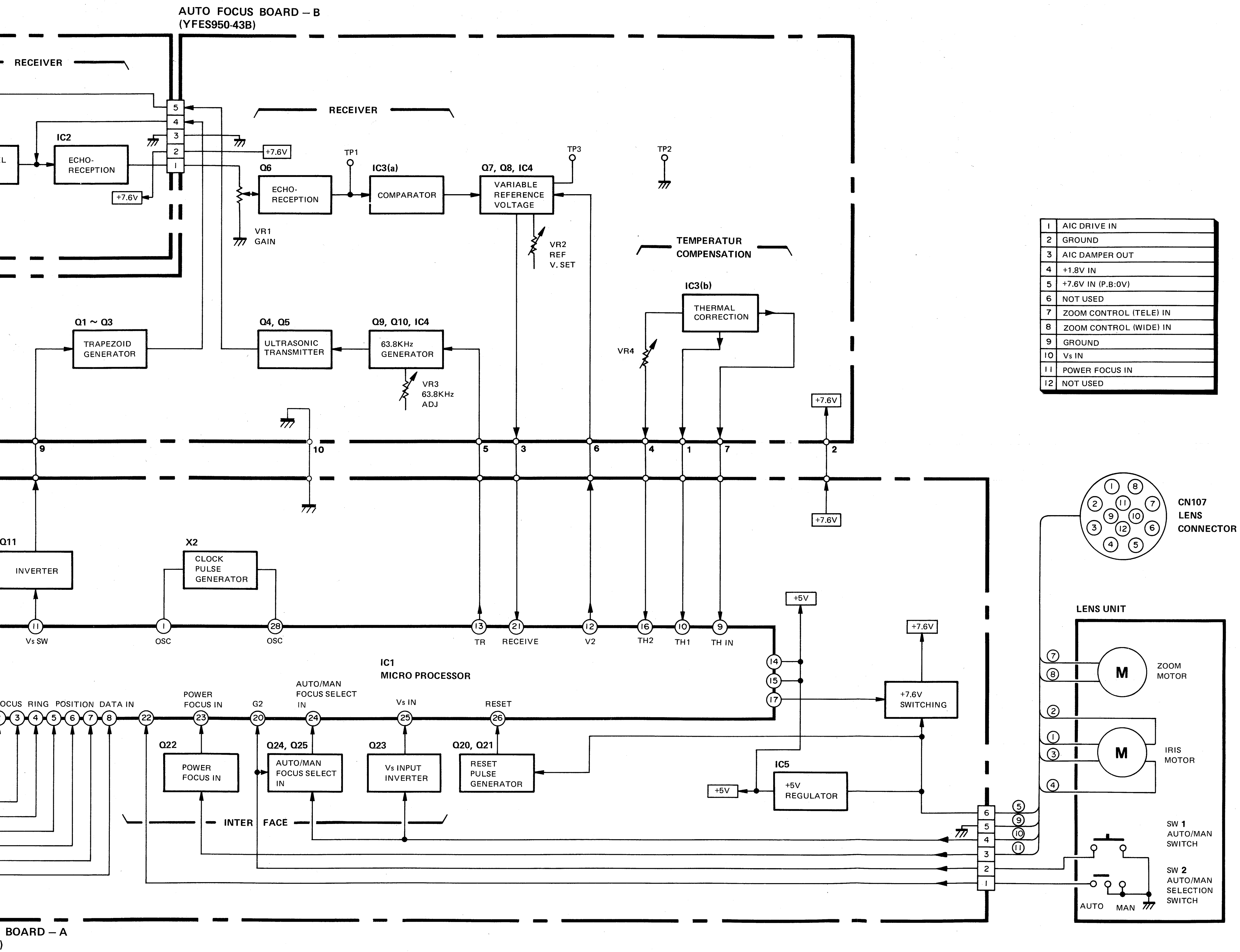
BLOCK DIAGRAM OF MICRO PROCESSOR BOARD (YFVPKA2004EA)


Q4306
LOW LIGHT SWITCHING
H:LOW LIGHT L:NORMAL
Q4305
REC REVIEW SWITCHING
H:REC L:REVIEW
Q4304
REC INDICATOR SWITCHING
H:REC L:PLAY BACK
Q4303
INDOOR/OUTDOOR SWITCHING
H:INDOOR L:OUTDOOR
Q4302
PB DC SWITCHING
H:PLAY BACK L:REC
Q4301
WHITE SET SWITCHING
H:WHITE SET L:NORMAL
CN6 ⑤
CN7 ⑧
CN6 ⑥
CN5 ①
CN8 ④
CN4 ①
Q4406
B-YL DETECTION
Q4405
FADE SWITCHING
H:FADE L:NORMAL
Q4404
BEAM
H:OFF L:ON
H:⊖ L:⊕
Q4403
VTR COMPATIBILITY
Q4402
R-YL DETECTION
Q4401
REC SWITCHING
H:FADE L:REC
CN7 ④
B11 ⑧
CN6 ①
CN7 ③
D16
D13
Q19
FADE SIGNAL DISPLAY
Q18
BACK-UP BATTERY WARNING
Q15,Q16,Q17
FADE SIGNAL CONTROL
H:FADE L:REC
Z1
v w u t s
IC1
DAØ VSS OSC2 OSC1
VR1
DA1 DA2 DA3 DA4 DA5 DA6
V.SYNC H.SYNC
EXT TITLE POLARITY DO3
TITLE COLOR SELECT
DO2 DO1 DOØ
CN2 ③
LDI ADM VDD
y x
IC2
P32 P31 P30 P23 P22 P21 P20 RST SBI SBO SBT IRQ SIRQ P13 P12
CN6 ④
CN6 ②
P33 P40 P41 P42 P43 P50 P51
B11 ⑦ P52(PLAY BACK CONTROL OUT)
VDD
CN8 ② PC1
CN8 ① P53
P60 P61 P62 P63
LDI P11 ADM P10
PO3 V.SYNC PO2 PO1 PO0 VSS X0 X1 OSC1 OSC2
PB2 PB1 PB0
P70 P71 P72 P73 P80 P81 P82 P83 P90 P91 P92 P93 PA0 PA1 PA2 PA3
SERIAL CLOCK
CN8 ③ CN8 ⑦
X1 X2 CT1
Q2, Q30
POWER CONTROL
Q32
RESET PULSE INVERTOR
IC4 ⑤
P52
+5.0V
+7.6V
Q1,Q3 Q4,Q5
CHARACTER SELECT AMP
Q31
V.SYNC BUFFER
aa bb cc
Q40
POWER ON/OFF SWITCHING
Q8
SERIAL DATA CONTROL AMP
Q7
SERIAL CLOCK AMP
Q6
SERIAL CLOCK INVERTOR
POWER +5:0V NO POWER:5V
Q33
H.SYNC INVERTOR
Q10 Q11
TIMER COUNTOR SELECT
Q13
REC START/PAUSE CONTROL
+7.6V
Q35
STANDBY REC PROTECTION
B11
10 BACK-UP WARNING IN
9 VDD IN
8 BEAM DETECT IN
7 PLAY BACK CONTROL OUT
6 +5V IN
5 CPU RESET IN
4 +7.6V IN
3 CHARACTER OUT
2 H.SYNC IN
1 V.SYNC IN
TO DEFLECTION BOARD..CN6
CN8
P93
7 NEGA/POS/CONTROL OUT
6 EXT TITLE POLARITY OUT
5 EXT VIDEO OUT
IC3 ②
4 PLAY BACK CONTROL IN
P92
3 REC RESET OUT
PC1
2 TITLE COLOUR CORRECT OUT
P53
1 EXT TITLE CONT OUT
TO PROCESS BOARD..B12
CN101 VTR CONNECTOR
CN3
3 VTR REC CONTROL OUT
2 SERIAL CLOCK IN
1 SERIAL DATA IN/OUT
Z5
Q12
STANDBY DETECT
+5.0V
+4.8V(1)
Q20
TIMER COUNT PULSE AMP
Q9,Q34
CAMER POWER ON/OFF DETECT
+7.6V
+5.0V
Q14
REC FADE AMP
+4.8V(1)
Z4

BLOCK DIAGRAM OF AUTO FOCUS LENS BOARD (YFES950-43A, YFES950-43B, YFES950-43

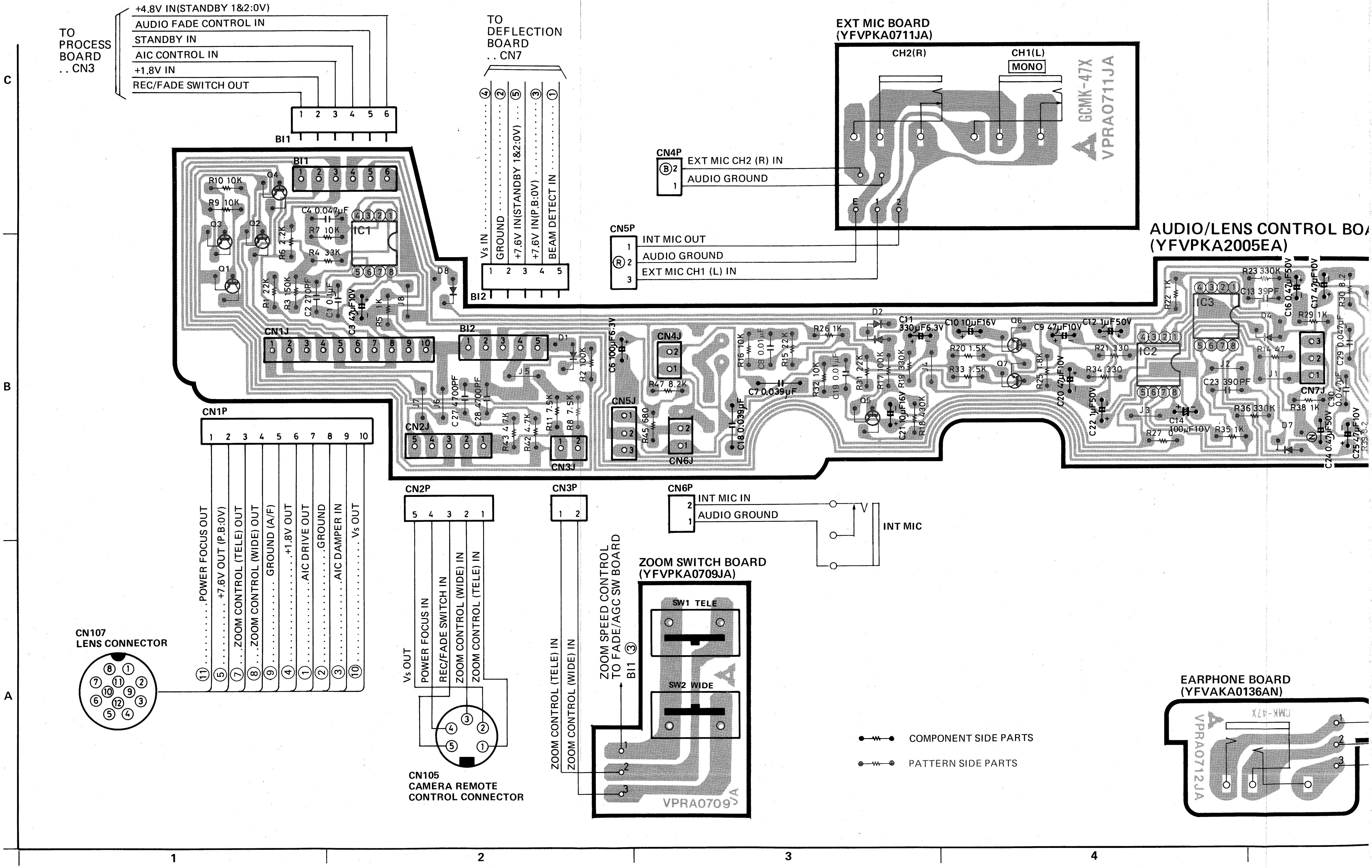

AUTO FOCUS BOARD – C
(YFES950-43C)
AUTO FOCUS BOARD – B
(YFES950-43B)
AUTO FOCUS BOARD – A
(YFES950-43A)
X1
PCM
TRANSDUCER
TRANSMITTER
RECEIVER
D3, D4
HIGH LEVEL CLIPPER
D1, D2
LOW LEVEL CLIPPER
IC2
ECHO-RECEPTION
+7.6V
5
4
3
2
1
RECEIVER
Q6
ECHO-RECEPTION
VR1
GAIN
TP1
IC3(a)
COMPARATOR
Q7, Q8, IC4
VARIABLE REFERENCE VOLTAGE
TP3
TP2
VR2
REF
V. SET
TEMPERATUR COMPENSATION
IC3(b)
THERMAL CORRECTION
VR4
Q1 ~ Q3
TRAPEZOID GENERATOR
Q4, Q5
ULTRASONIC TRANSMITTER
Q9, Q10, IC4
63.8KHz GENERATOR
VR3
63.8KHz
ADJ
AUTO
FOCUS
MOTOR
M
8
9
10
5
3
6
4
1
7
2
1
2
Q14, Q15
CURRENT LIMITER
Q11
INVERTER
X2
CLOCK PULSE GENERATOR
+5V
FOCUS CONTROL
Q16 ~ Q19
FOCUS CONTROL
Vs SW
OSC
OSC
TR
RECEIVE
V2
TH2
TH1
TH IN
IC1
MICRO PROCESSOR
FOCUS RING POSITION DATA IN
POWER FOCUS IN
G2
AUTO/MAN FOCUS SELECT IN
Vs IN
RESET
+7.6V SWITCH
Q22
POWER FOCUS IN
Q24, Q25
AUTO/MAN FOCUS SELECT IN
Q23
Vs INPUT INVERTER
Q20, Q21
RESET PULSE GENERATOR
IC5
+5V REGULATOR
INTER FACE
FOCUS
RING
POSITION
SENSOR

K DIAGRAM OF AUTO FOCUS LENS BOARD (YFES950-43A, YFES950-43B, YFES950-43C)

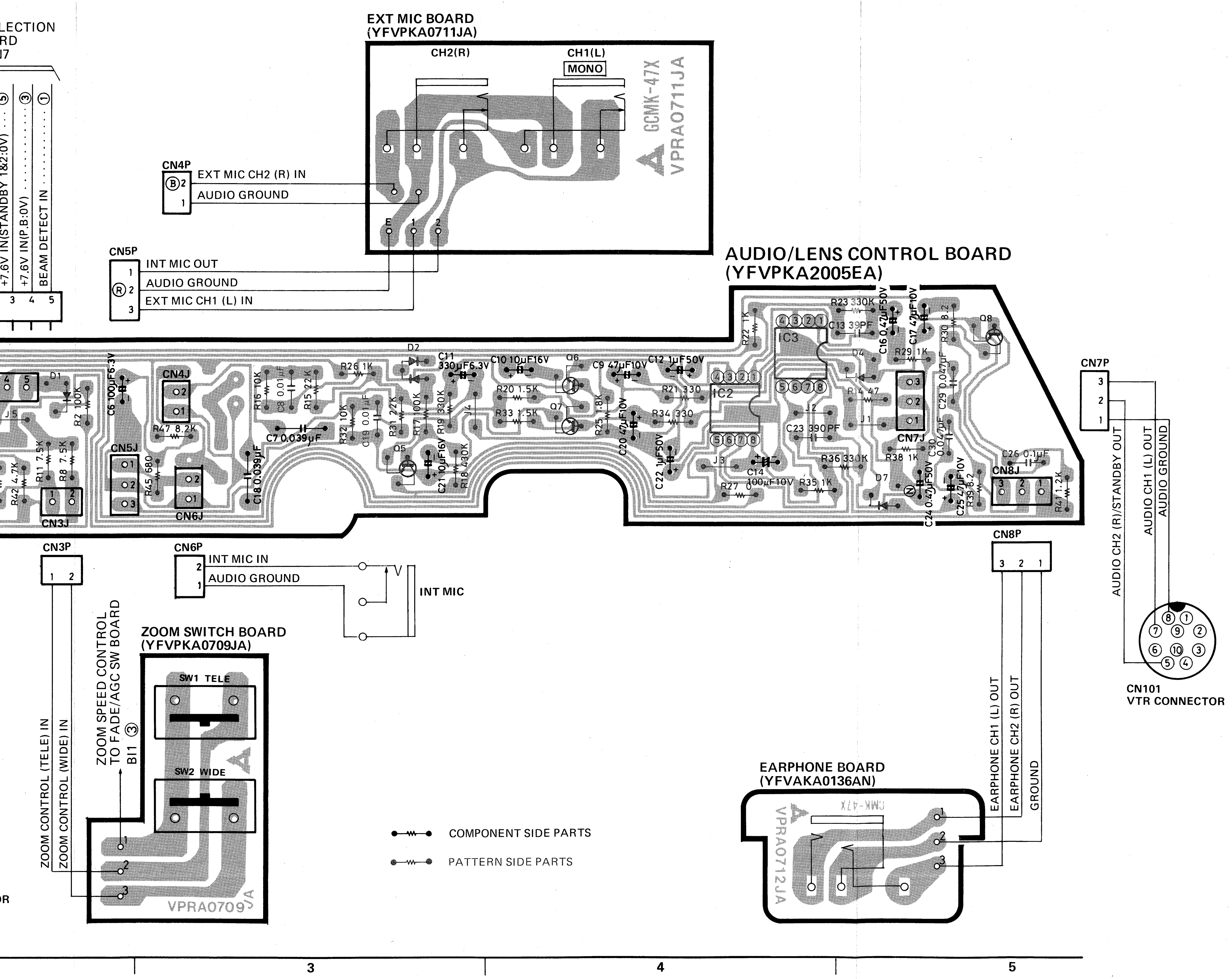

AUTO FOCUS BOARD – B
(YFES950-43B)
RECEIVER
IC2
ECHO-RECEPTION
L
+7.6V
5
4
3
2
1
RECEIVER
+7.6V
Q6
ECHO-RECEPTION
VR1
GAIN
TP1
IC3(a)
COMPARATOR
Q7, Q8, IC4
VARIABLE REFERENCE VOLTAGE
TP3
VR2
REF
V. SET
TP2
TEMPERATUR COMPENSATION
IC3(b)
THERMAL CORRECTION
VR4
Q1 ~ Q3
TRAPEZOID GENERATOR
Q4, Q5
ULTRASONIC TRANSMITTER
Q9, Q10, IC4
63.8KHz GENERATOR
VR3
63.8KHz
ADJ
+7.6V
9
10
5
3
6
4
1
7
2
+7.6V
Q11
INVERTER
X2
CLOCK PULSE GENERATOR
11
Vs SW
1
OSC
28
OSC
13
TR
21
RECEIVE
12
V2
16
TH2
10
TH1
9
TH IN
+5V
+7.6V
14
15
17
IC1
MICRO PROCESSOR
+7.6V SWITCHING
OCUS RING POSITION DATA IN
3 4 5 6 7 8
22
POWER FOCUS IN
23
G2
20
AUTO/MAN FOCUS SELECT IN
24
Vs IN
25
RESET
26
Q22
POWER FOCUS IN
Q24, Q25
AUTO/MAN FOCUS SELECT IN
Q23
Vs INPUT INVERTER
Q20, Q21
RESET PULSE GENERATOR
IC5
+5V REGULATOR
+5V
INTER FACE
6
5
4
3
2
1
5
9
10
11
BOARD – A
CN107
LENS CONNECTOR
1 8 2 11 7 9 10 3 12 6 4 5
LENS UNIT
7
8
M
ZOOM MOTOR
2
1
3
4
M
IRIS MOTOR
SW 1
AUTO/MAN SWITCH
SW 2
AUTO/MAN SELECTION SWITCH
AUTO
MAN

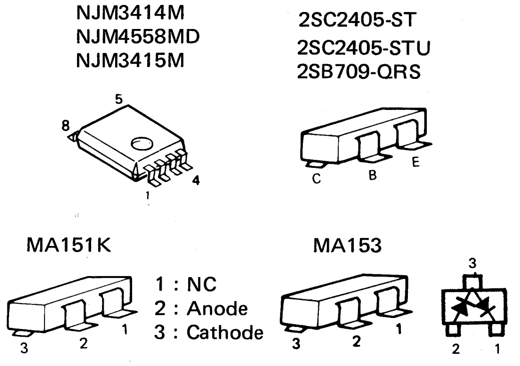
1	AIC DRIVE IN
2	GROUND
3	AIC DAMPER OUT
4	+1.8V IN
5	+7.6V IN (P.B:0V)
6	NOT USED
7	ZOOM CONTROL (TELE) IN
8	ZOOM CONTROL (WIDE) IN
9	GROUND
10	Vs IN
11	POWER FOCUS IN
12	NOT USED

CONDUCTOR VIEW OF AUDIO/LENS CONTROL BOARD (YFVPKA2005EA)


C
B
A
1
2
3
4
TO PROCESS BOARD ..CN3
+4.8V IN(STANDBY 1&2:0V)
AUDIO FADE CONTROL IN
STANDBY IN
AIC CONTROL IN
+1.8V IN
REC/FADE SWITCH OUT
BI1
TO DEFLECTION BOARD ..CN7
Vs IN
GROUND
+7.6V IN(STANDBY 1&2:0V)
+7.6V IN(P.B:0V)
BEAM DETECT IN
BI2
EXT MIC BOARD (YFVPKA0711JA)
CH2(R)
CH1(L)
MONO
GCMK-47X
VPRA0711JA
CN4P
EXT MIC CH2 (R) IN
AUDIO GROUND
CN5P
INT MIC OUT
AUDIO GROUND
EXT MIC CH1 (L) IN
AUDIO/LENS CONTROL BOA
(YFVPKA2005EA)
R10 10K
R9 10K
Q4
Q3
Q2
Q1
C4 0.047μF
R7 10K
R4 33K
IC1
R6 2.2K
R1 22K
R3 150K
C2 270PF
C1 0.1μF
C3 47μF10V
R5 1K
J8
D8
CN1J
BI2
D1
R2 100K
J5
J7
J6
C27 4700PF
C28 4700PF
CN2J
R43 4.7K
R42 4.7K
R11 7.5K
R8 7.5K
CN3J
C6 100μF6.3V
CN4J
CN5J
R45 680
CN6J
R47 8.2K
C18 0.039μF
R16 10K
C8 0.01μF
R15 22K
C7 0.039μF
R26 1K
D2
C11 330μF6.3V
C10 10μF16V
Q6
C9 47μF10V
C12 1μF50V
R32 10K
C19 0.01μF
R31 22K
R17 100K
R19 330K
J4
R20 1.5K
R33 1.5K
Q7
R25 1.8K
C20 47μF10V
Q5
C21 10μF16V
R18 430K
R21 330
R34 330
IC2
C22 1μF50V
J3
R22 1K
IC3
R23 330K
C13 39PF
C16 0.47μF50V
C17 47μF10V
R30 8.2
D4
R29 1K
R14 47
C29 0.047μF
J2
J1
C23 390PF
CN7J
R36 330K
R38 1K
C30 0.047μF
C14 100μF10V
R27 0
R35 1K
D7
C24 0.47μF50V
C25 47μF10V
R39 8.2
CN1P
POWER FOCUS OUT
+7.6V OUT (P.B:0V)
ZOOM CONTROL (TELE) OUT
ZOOM CONTROL (WIDE) OUT
GROUND (A/F)
+1.8V OUT
AIC DRIVE OUT
GROUND
AIC DAMPER IN
Vs OUT
CN107
LENS CONNECTOR
CN2P
Vs OUT
POWER FOCUS IN
REC/FADE SWITCH IN
ZOOM CONTROL (WIDE) IN
ZOOM CONTROL (TELE) IN
CN105
CAMERA REMOTE CONTROL CONNECTOR
CN3P
ZOOM CONTROL (TELE) IN
ZOOM CONTROL (WIDE) IN
ZOOM SPEED CONTROL TO FADE/AGC SW BOARD BI1 ③
ZOOM SWITCH BOARD (YFVPKA0709JA)
SW1 TELE
SW2 WIDE
VPRA0709JA
CN6P
INT MIC IN
AUDIO GROUND
INT MIC
COMPONENT SIDE PARTS
PATTERN SIDE PARTS
EARPHONE BOARD (YFVAKA0136AN)
CMK-47X
VPRA0712JA

CONDUCTOR VIEW OF AUDIO/LENS CONTROL BOARD (YFVPKA2005EA)

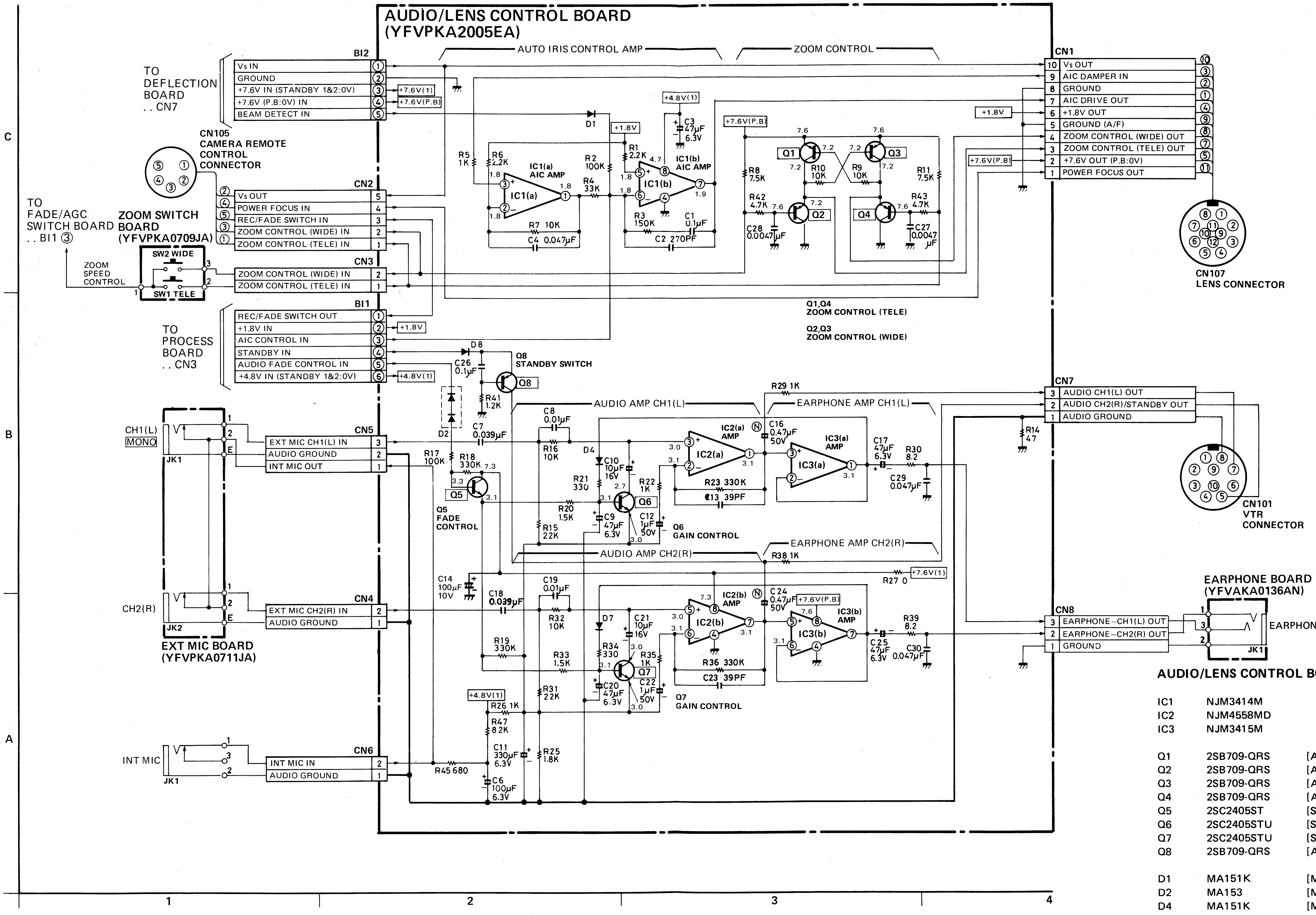

LECTION
RD
17
+7.6V IN(STANDBY 1&2:0V) ⑤
+7.6V IN(P.B:0V) ③
BEAM DETECT IN ①
3 4 5
EXT MIC BOARD
(YFVPKA0711JA)
CH2(R)
CH1(L)
MONO
GCMK-47X
VPRA0711JA
E 1 2
CN4P
EXT MIC CH2 (R) IN
AUDIO GROUND
CN5P
INT MIC OUT
AUDIO GROUND
EXT MIC CH1 (L) IN
AUDIO/LENS CONTROL BOARD
(YFVPKA2005EA)
R23 330K
C13 39PF
C16 0.47μF50V
C17 47μF10V
R30 8.2
Q8
IC3
R22 1K
R29 1K
D4
R14 47
C29 0.047μF
J2
J1
CN7J
IC2
C23 390PF
C30 0.047μF
R36 330K
R38 1K
C14 100μF10V
R35 1K
R27 0
J3
D7
C24 0.47μF50V
C25 47μF10V
R39 8.2
C26 0.1μF
CN8J
R41 1.2K
D2
C11 330μF6.3V
C10 10μF16V
Q6
C9 47μF10V
C12 1μF50V
R21 330
R34 330
R20 1.5K
R33 1.5K
Q7
R25 1.8K
C20 47μF10V
C22 1μF50V
R26 1K
R16 10K
C8 0.01μF
R15 22K
R32 10K
C19 0.01μF
R31 22K
R17 100K
R19 330K
C21 10μF16V
R18 430K
Q5
C7 0.039μF
C18 0.039μF
C6 100μF6.3V
CN4J
R47 8.2K
CN5J
R45 680
CN6J
D1
R2 100K
R11 7.5K
R8 7.5K
R42 4.7K
J5
CN3J
CN7P
CN3P
CN6P
INT MIC IN
AUDIO GROUND
INT MIC
CN8P
AUDIO CH2 (R)/STANDBY OUT
AUDIO CH1 (L) OUT
AUDIO GROUND
CN101
VTR CONNECTOR
ZOOM SPEED CONTROL
TO FADE/AGC SW BOARD
B11 ③
ZOOM SWITCH BOARD
(YFVPKA0709JA)
SW1 TELE
SW2 WIDE
VPRA0709JA
ZOOM CONTROL (TELE) IN
ZOOM CONTROL (WIDE) IN
EARPHONE BOARD
(YFVAKA0136AN)
CMK-47X
VPRA0712JA
EARPHONE CH1 (L) OUT
EARPHONE CH2 (R) OUT
GROUND
COMPONENT SIDE PARTS
PATTERN SIDE PARTS
OR
3
4
5


NJM3414M
NJM4558MD
NJM3415M
8
5
1
4
2SC2405-ST
2SC2405-STU
2SB709-QRS
C B E
MA151K
1 : NC
2 : Anode
3 : Cathode
MA153
3 2 1
3 2 1
3
2 1

AUDIO/LENS CONTROL BOARD

IC1	NJM3414M		C2
IC2	NJM4558MD		B4
IC3	NJM3415M		B4
Q1	2SB709-QRS	[A]	B1
Q2	2SB709-QRS	[A]	B1
Q3	2SB709-QRS	[A]	B1
Q4	2SB709-QRS	[A]	C1
Q5	2SC2405ST	[S]	B3
Q6	2SC2405STU	[S]	B4
Q7	2SC2405STU	[S]	B4
Q8	2SB709-QRS	[A]	B5
D1	MA151K	[MH]	B2
D2	MA153	[MC]	B3
D4	MA151K	[MH]	B5
D7	MA151K	[MH]	B5
D8	MA151K	[MH]	B2

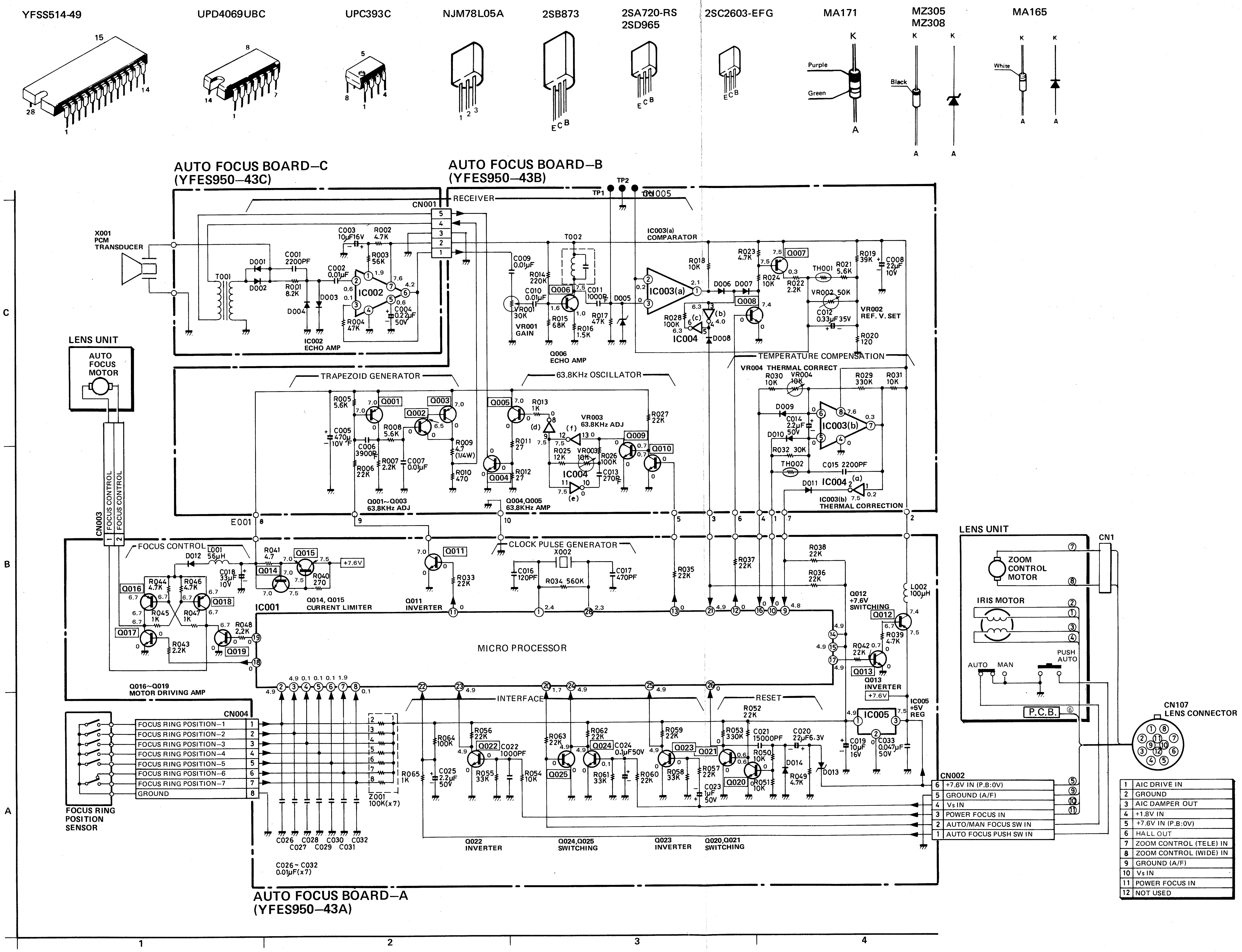
SCHEMATIC DIAGRAM OF AUDIO/LENS CONTROL BOARD (YFVPKA2005EA)


AUDIO/LENS CONTROL BOARD
(YFVPKA2005EA)
AUTO IRIS CONTROL AMP
ZOOM CONTROL
TO DEFLECTION BOARD ..CN7
BI2
Vs IN
GROUND
+7.6V IN (STANDBY 1&2:0V)
+7.6V (P.B:0V) IN
BEAM DETECT IN
CN105 CAMERA REMOTE CONTROL CONNECTOR
CN2
Vs OUT
POWER FOCUS IN
REC/FADE SWITCH IN
ZOOM CONTROL (WIDE) IN
ZOOM CONTROL (TELE) IN
TO FADE/AGC SWITCH BOARD ..BI1 ③
ZOOM SWITCH BOARD (YFVPKA0709JA)
SW2 WIDE
SW1 TELE
ZOOM SPEED CONTROL
CN3
ZOOM CONTROL (WIDE) IN
ZOOM CONTROL (TELE) IN
TO PROCESS BOARD ..CN3
BI1
REC/FADE SWITCH OUT
+1.8V IN
AIC CONTROL IN
STANDBY IN
AUDIO FADE CONTROL IN
+4.8V IN (STANDBY 1&2:0V)
IC1(a) AIC AMP
IC1(b) AIC AMP
Q1,Q4 ZOOM CONTROL (TELE)
Q2,Q3 ZOOM CONTROL (WIDE)
Q8 STANDBY SWITCH
CN1
Vs OUT
AIC DAMPER IN
GROUND
AIC DRIVE OUT
+1.8V OUT
GROUND (A/F)
ZOOM CONTROL (WIDE) OUT
ZOOM CONTROL (TELE) OUT
+7.6V OUT (P.B:0V)
POWER FOCUS OUT
CN107 LENS CONNECTOR
CH1(L)
MONO
JK1
CN5
EXT MIC CH1(L) IN
AUDIO GROUND
INT MIC OUT
AUDIO AMP CH1(L)
EARPHONE AMP CH1(L)
IC2(a) AMP
IC3(a) AMP
Q5 FADE CONTROL
Q6 GAIN CONTROL
CN7
AUDIO CH1(L) OUT
AUDIO CH2(R)/STANDBY OUT
AUDIO GROUND
CN101 VTR CONNECTOR
CH2(R)
JK2
CN4
EXT MIC CH2(R) IN
AUDIO GROUND
EXT MIC BOARD (YFVPKA0711JA)
AUDIO AMP CH2(R)
EARPHONE AMP CH2(R)
IC2(b) AMP
IC3(b) AMP
Q7 GAIN CONTROL
EARPHONE BOARD (YFVAKA0136AN)
EARPHONE
CN8
EARPHONE-CH1(L) OUT
EARPHONE-CH2(R) OUT
GROUND
INT MIC
CN6
INT MIC IN
AUDIO GROUND
1
2
3
4
A
B
C

AUDIO/LENS CONTROL BOARD

IC1	NJM3414M		C2,C3
IC2	NJM4558MD		A3,B3
IC3	NJM3415M		A3,B3
Q1	2SB709-QRS	[A]	C3
Q2	2SB709-QRS	[A]	C3
Q3	2SB709-QRS	[A]	C3
Q4	2SB709-QRS	[A]	C3
Q5	2SC2405ST	[S]	B2
Q6	2SC2405STU	[S]	B3
Q7	2SC2405STU	[S]	A3
Q8	2SB709-QRS	[A]	B2
D1	MA151K	[MH]	C2
D2	MA153	[MC]	B2
D4	MA151K	[MH]	B2
D7	MA151K	[MH]	A2
D8	MA151K	[MH]	B2

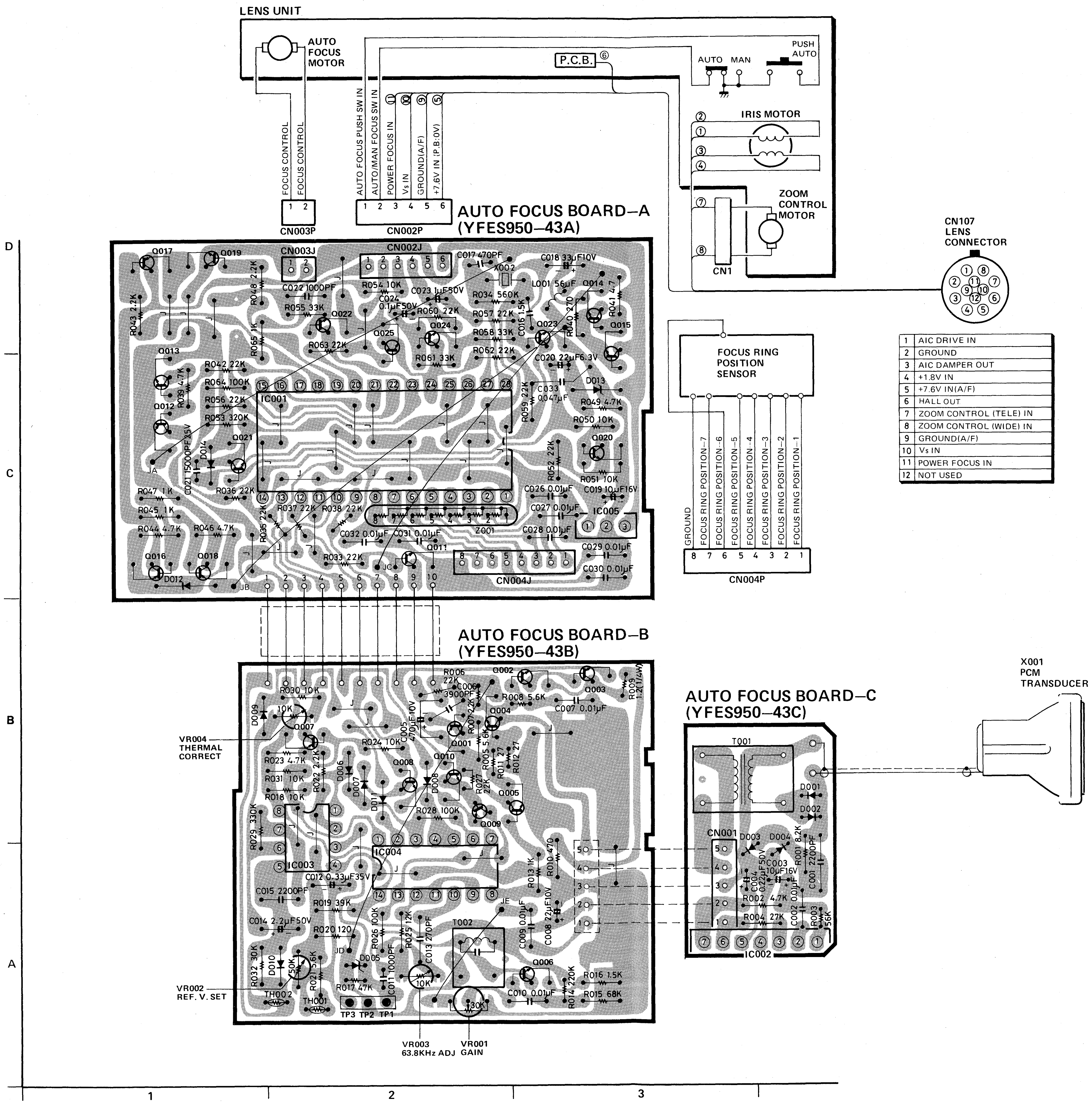
SCHEMATIC DIAGRAM OF AUTO FOCUS LENS BOARD


YFSS514-49
UPD4069UBC
UPC393C
NJM78L05A
2SB873
2SA720-RS
2SD965
2SC2603-EFG
MA171
MZ305
MZ308
MA165
Purple
Green
Black
White
AUTO FOCUS BOARD–C
(YFES950–43C)
AUTO FOCUS BOARD–B
(YFES950–43B)
AUTO FOCUS BOARD–A
(YFES950–43A)
X001 PCM TRANSDUCER
RECEIVER
IC002 ECHO AMP
Q006 ECHO AMP
IC003(a) COMPARATOR
VR001 GAIN
VR002 REF. V. SET
TEMPERATURE COMPENSATION
VR004 THERMAL CORRECT
IC003(b) THERMAL CORRECTION
TRAPEZOID GENERATOR
63.8KHz OSCILLATOR
VR003 63.8KHz ADJ
Q001~Q003 63.8KHz ADJ
Q004,Q005 63.8KHz AMP
CLOCK PULSE GENERATOR
LENS UNIT
AUTO FOCUS MOTOR
FOCUS CONTROL
CN003
Q014, Q015 CURRENT LIMITER
Q011 INVERTER
IC001
MICRO PROCESSOR
Q016~Q019 MOTOR DRIVING AMP
Q012 +7.6V SWITCHING
Q013 INVERTER
IC005 +5V REG
PUSH AUTO
AUTO MAN
INTERFACE
RESET
CN004
FOCUS RING POSITION–1
FOCUS RING POSITION–2
FOCUS RING POSITION–3
FOCUS RING POSITION–4
FOCUS RING POSITION–5
FOCUS RING POSITION–6
FOCUS RING POSITION–7
GROUND
FOCUS RING POSITION SENSOR
Z001 100K(x7)
C026~C032 0.01µF(x7)
Q022 INVERTER
Q024,Q025 SWITCHING
Q023 INVERTER
Q020,Q021 SWITCHING
LENS UNIT
ZOOM CONTROL MOTOR
IRIS MOTOR
P.C.B.
CN1
CN002
6 +7.6V IN (P.B:0V)
5 GROUND (A/F)
4 Vs IN
3 POWER FOCUS IN
2 AUTO/MAN FOCUS SW IN
1 AUTO FOCUS PUSH SW IN
CN107 LENS CONNECTOR
1 AIC DRIVE IN
2 GROUND
3 AIC DAMPER OUT
4 +1.8V IN
5 +7.6V IN (P.B:0V)
6 HALL OUT
7 ZOOM CONTROL (TELE) IN
8 ZOOM CONTROL (WIDE) IN
9 GROUND (A/F)
10 Vs IN
11 POWER FOCUS IN
12 NOT USED
A
B
C
1
2
3
4

AUTO FOCUS LENS BOARD

IC001	YFSS514-77	B2,B3
IC002	TA7120P	C2
IC003	UPC393C	C3,C4
IC004	UPD4069UBC	B3,C3
IC005	NJM78L05A	A4
Q001	2SA1115	C2
Q002	2SC2603	C2
Q003	2SB873	C2
Q004	2SD965	B2
Q005	2SC1317	B2
Q006	2SC2603	C3
Q007	2SA1115	C4
Q008	2SC2603	C3
Q009	2SC2603	B3
Q010	2SC2603	B3
Q011	2SC2603	B2
Q012	2SA1115	B4
Q013	2SC2603	B4
Q014	2SC2603	B2
Q015	2SD965	B2
Q016	2SA720	B1
Q017	2SD965	B1
Q018	2SA720	B1
Q019	2SD965	B1
Q020	2SC2603	A3
Q021	2SC2603	A3
Q022	2SC2603	A2
Q023	2SC2603	A3
Q024	2SC2603	A3
Q025	2SC2603	A3
D001	MA171	C1
D002	MA171	C2
D003	MA171	C2
D004	MA171	C2
D005	MZ308	C3
D006	MA165	C3
D007	MA165	C3
D008	MA165	C3
D009	MA165	C4
D010	MA165	C4
D011	MA165	B4
D012	1N4002	B1
D013	MZ305	A4
D014	MA165	A4

CONDUCTOR VIEW OF AUTO FOCUS BOARD

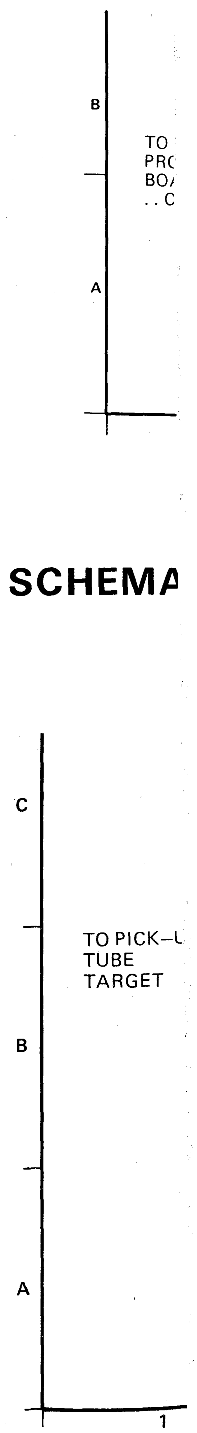

LENS UNIT
AUTO FOCUS MOTOR
P.C.B. ⑥
PUSH AUTO
AUTO MAN
IRIS MOTOR
ZOOM CONTROL MOTOR
CN1
FOCUS CONTROL
FOCUS CONTROL
1 2
CN003P
AUTO FOCUS PUSH SW IN
AUTO/MAN FOCUS SW IN
POWER FOCUS IN
Vs IN
GROUND(A/F)
+7.6V IN (P.B:0V)
1 2 3 4 5 6
CN002P
AUTO FOCUS BOARD–A
(YFES950–43A)
CN003J
CN002J
IC001
IC005
Z001
CN004J
X002
L001 56μF
AUTO FOCUS BOARD–B
(YFES950–43B)
IC003
IC004
T002
VR004 THERMAL CORRECT
VR002 REF. V. SET
TH002
TH001
TP3 TP2 TP1
VR003 63.8KHz ADJ
VR001 GAIN
AUTO FOCUS BOARD–C
(YFES950–43C)
T001
CN001
IC002
FOCUS RING POSITION SENSOR
GROUND
FOCUS RING POSITION–7
FOCUS RING POSITION–6
FOCUS RING POSITION–5
FOCUS RING POSITION–4
FOCUS RING POSITION–3
FOCUS RING POSITION–2
FOCUS RING POSITION–1
8 7 6 5 4 3 2 1
CN004P
CN107
LENS
CONNECTOR
X001
PCM
TRANSDUCER
D
C
B
A
1
2
3

1	AIC DRIVE IN
2	GROUND
3	AIC DAMPER OUT
4	+1.8V IN
5	+7.6V IN(A/F)
6	HALL OUT
7	ZOOM CONTROL (TELE) IN
8	ZOOM CONTROL (WIDE) IN
9	GROUND(A/F)
10	Vs IN
11	POWER FOCUS IN
12	NOT USED

AUTO FOCUS BOARD

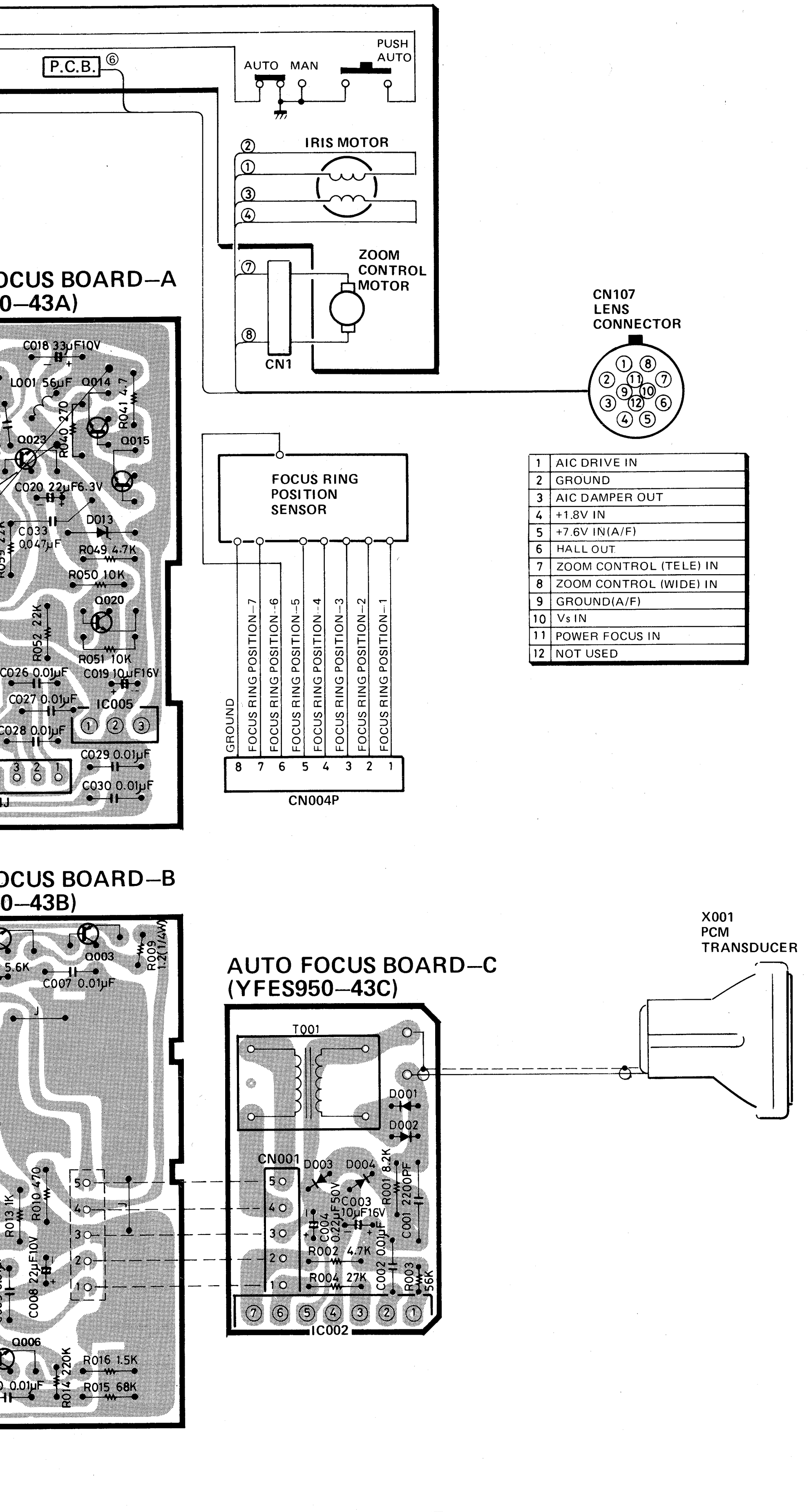
IC001	YFSS514-77	C2
IC002	TA7120P	A3
IC003	UPC393C	A2
IC004	UPD4069UBC	A2
IC005	NJM78L05A	C3
Q001	2SA1115	B2
Q002	2SC2603	B2
Q003	2SB873	B3
Q004	2SD965	B2
Q005	2SC1317	B2
Q006	2SC2603	A3
Q007	2SA1115	B2
Q008	2SC2603	B2
Q009	2SC2603	B2
Q010	2SC2603	B2
Q011	2SC2603	C2
Q012	2SA1115	C1
Q013	2SC2603	C1
Q014	2SC2603	D3
Q015	2SD965	D3
Q016	2SA720	C1
Q017	2SD965	D1
Q018	2SA720	C1
Q019	2SD965	D1
Q020	2SC2603	C3
Q021	2SC2603	C1
Q022	2SC2603	D2
Q023	2SC2603	D3
Q024	2SC2603	D2
Q025	2SC2603	D2
D001	MA171	B4
D002	MA171	B4
D003	MA171	A3
D004	MA171	A4
D005	MZ308	A2
D006	MA165	B2
D007	MA165	B2
D008	MA165	B2
D009	MA165	B1
D010	MA165	A2
D011	MA165	B2
D012	1N4002	C1
D013	MZ305	C3
D014	MA165	C1

CON


B
TO
PR
BO
. . C
A
C
TO PICK–U
TUBE
TARGET
B
A
1

SCHEMA

UTO FOCUS BOARD


P.C.B. ⑥
AUTO MAN
PUSH AUTO
IRIS MOTOR
ZOOM CONTROL MOTOR
CN1
OCUS BOARD–A
0–43A)
CN107
LENS CONNECTOR
FOCUS RING POSITION SENSOR
GROUND
FOCUS RING POSITION-7
FOCUS RING POSITION-6
FOCUS RING POSITION-5
FOCUS RING POSITION-4
FOCUS RING POSITION-3
FOCUS RING POSITION-2
FOCUS RING POSITION-1
CN004P
IC005
OCUS BOARD–B
0–43B)
AUTO FOCUS BOARD–C
(YFES950–43C)
T001
CN001
IC002
X001
PCM
TRANSDUCER

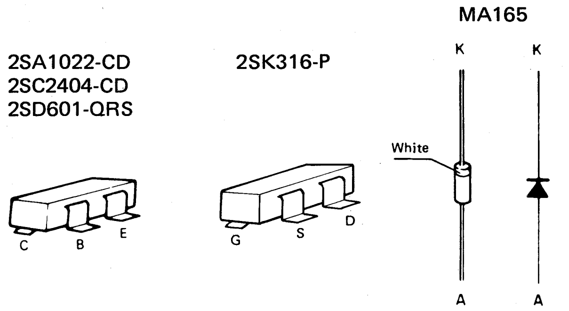
1	AIC DRIVE IN
2	GROUND
3	AIC DAMPER OUT
4	+1.8V IN
5	+7.6V IN(A/F)
6	HALL OUT
7	ZOOM CONTROL (TELE) IN
8	ZOOM CONTROL (WIDE) IN
9	GROUND(A/F)
10	Vs IN
11	POWER FOCUS IN
12	NOT USED

AUTO FOCUS BOARD

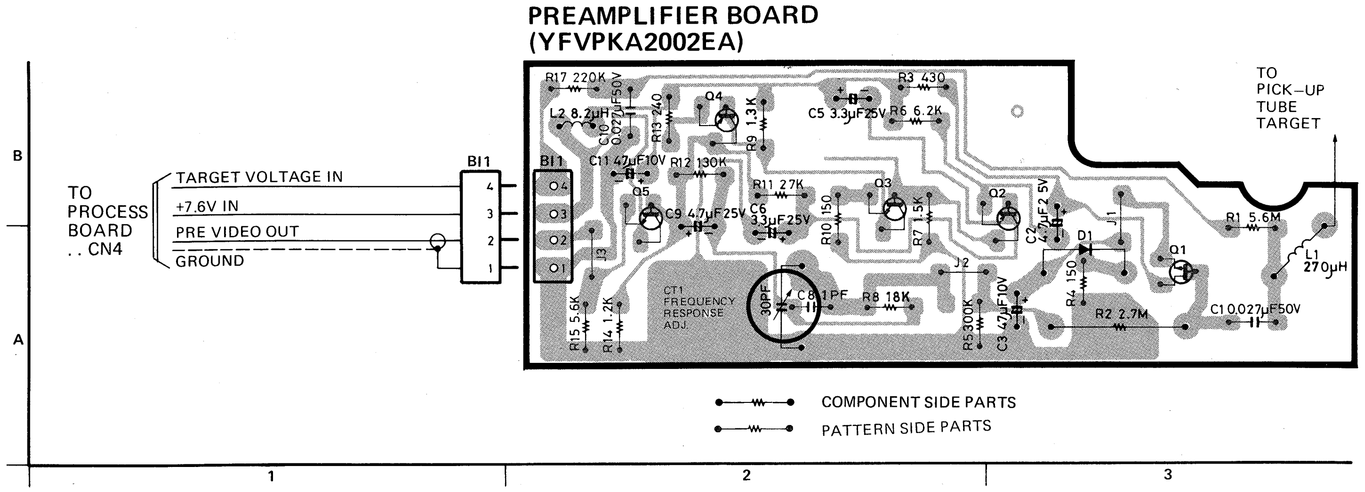
IC001	YFSS514-77	C2
IC002	TA7120P	A3
IC003	UPC393C	A2
IC004	UPD4069UBC	A2
IC005	NJM78L05A	C3
Q001	2SA1115	B2
Q002	2SC2603	B2
Q003	2SB873	B3
Q004	2SD965	B2
Q005	2SC1317	B2
Q006	2SC2603	A3
Q007	2SA1115	B2
Q008	2SC2603	B2
Q009	2SC2603	B2
Q010	2SC2603	B2
Q011	2SC2603	C2
Q012	2SA1115	C1
Q013	2SC2603	C1
Q014	2SC2603	D3
Q015	2SD965	D3
Q016	2SA720	C1
Q017	2SD965	D1
Q018	2SA720	C1
Q019	2SD965	D1
Q020	2SC2603	C3
Q021	2SC2603	C1
Q022	2SC2603	D2
Q023	2SC2603	D3
Q024	2SC2603	D2
Q025	2SC2603	D2
D001	MA171	B4
D002	MA171	B4
D003	MA171	A3
D004	MA171	A4
D005	MZ308	A2
D006	MA165	B2
D007	MA165	B2
D008	MA165	B2
D009	MA165	B1
D010	MA165	A2
D011	MA165	B2
D012	1N4002	C1
D013	MZ305	C3
D014	MA165	C1

PREAMPLIFIER BOARD

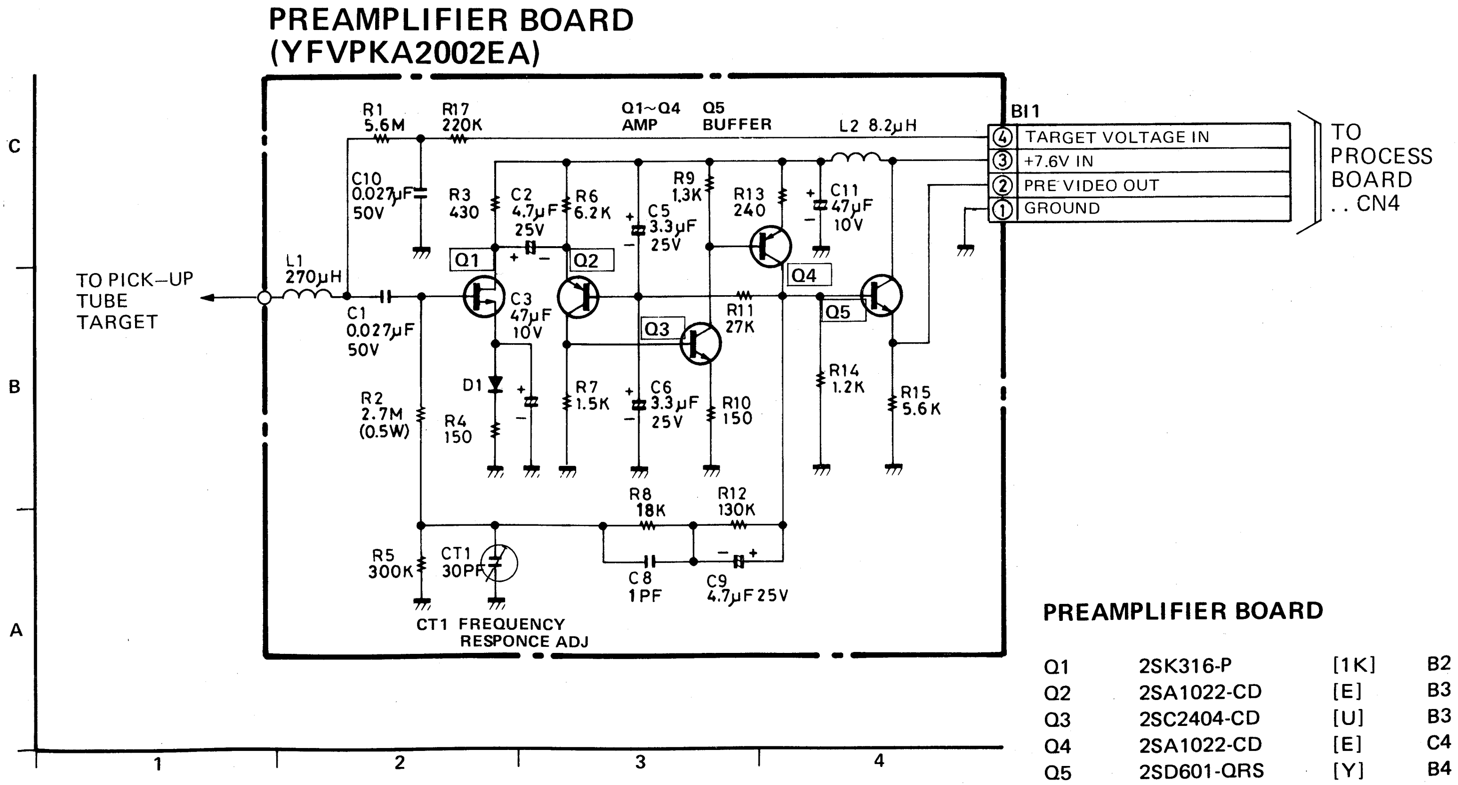
Q1	2SK316-P	[1K]	A3
Q2	2SA1022-CD	[E]	B3
Q3	2SC2404-CD	[U]	B2
Q4	2SA1022-CD	[E]	B2
Q5	2SD601-QRS	[Y]	B5
D1	MA165		A3


2SA1022-CD
2SC2404-CD
2SD601-QRS
C B E
2SK316-P
G S D
MA165
K
K
White
A
A

CONDUCTOR VIEW OF PREAMPLIFIER BOARD (YFVPKA2002EA)


PREAMPLIFIER BOARD
(YFVPKA2002EA)
TO PROCESS BOARD . . CN4
TARGET VOLTAGE IN
+7.6V IN
PRE VIDEO OUT
GROUND
BI1
TO PICK–UP TUBE TARGET
CT1 FREQUENCY RESPONSE ADJ
COMPONENT SIDE PARTS
PATTERN SIDE PARTS
B
A
1
2
3

SCHEMATIC DIAGRAM OF PREAMPLIFIER BOARD (YFVPKA2002EA)


PREAMPLIFIER BOARD
(YFVPKA2002EA)
R1 5.6M
R17 220K
Q1~Q4 AMP
Q5 BUFFER
L2 8.2μH
BI1
④ TARGET VOLTAGE IN
③ +7.6V IN
② PRE VIDEO OUT
① GROUND
TO PROCESS BOARD . . CN4
C10 0.027μF 50V
R3 430
C2 4.7μF 25V
R6 6.2K
C5 3.3μF 25V
R9 1.3K
R13 240
C11 47μF 10V
L1 270μH
TO PICK–UP TUBE TARGET
Q1
Q2
Q3
Q4
Q5
C1 0.027μF 50V
C3 47μF 10V
R11 27K
D1
R2 2.7M (0.5W)
R4 150
R7 1.5K
C6 3.3μF 25V
R10 150
R14 1.2K
R15 5.6K
R8 18K
R12 130K
R5 300K
CT1 30PF
C8 1PF
C9 4.7μF 25V
CT1 FREQUENCY RESPONCE ADJ
C
B
A
1
2
3
4

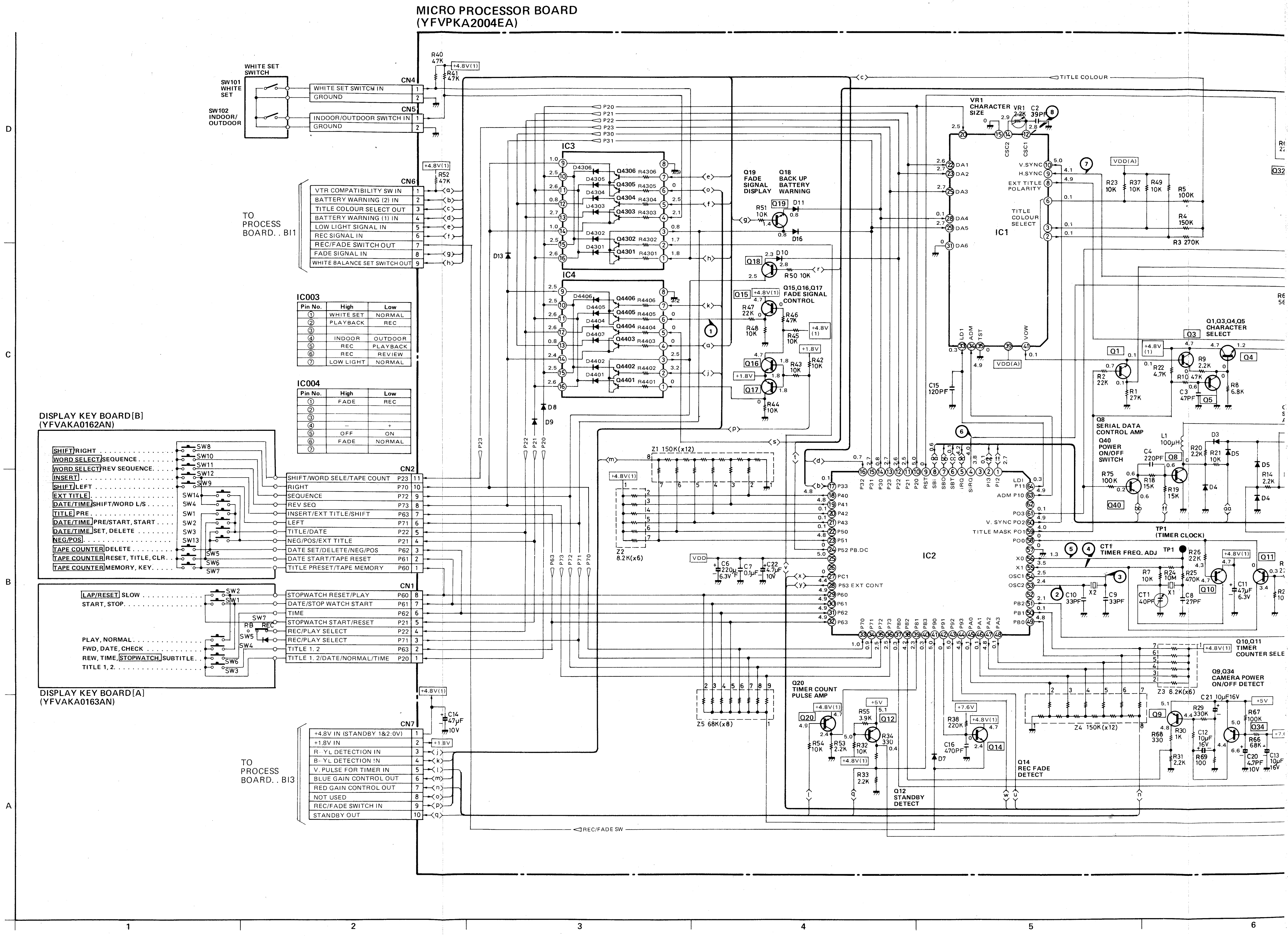
PREAMPLIFIER BOARD

Q1	2SK316-P	[1K]	B2
Q2	2SA1022-CD	[E]	B3
Q3	2SC2404-CD	[U]	B3
Q4	2SA1022-CD	[E]	C4
Q5	2SD601-QRS	[Y]	B4
D1	MA165		B2

SCHEMATIC DIAGRAM OF MICRO PROCESSOR BOARD (YFVPKA2004EA)

MICRO PROCESSOR BOARD

IC1	MN1237B		D5
IC2	MN1554CVB		B5
IC3	AN90B82S		D3
IC4	AN90B82S		C3
Q1	2SC2404-CD	[U]	C5
Q2	2SB709-QRS	[A]	C7
Q3	2SD601-QRS	[Y]	C6
Q4	2SD601-QRS	[Y]	C6
Q5	2SD601-QRS	[Y]	C6
Q6	2SD601-QRS	[Y]	B6
Q7	2SD601-QRS	[Y]	B6
Q8	2SD601-QRS	[Y]	B6
Q9	2SB814-RS	[1B]	A6
Q10	2SA1022-CD	[E]	B6
Q11	2SC2404-CD	[U]	B6
Q12	2SB709-QRS	[A]	A4
Q13	2SD602-QRS	[W]	B6
Q14	2SD601-QRS	[Y]	A5
Q15	2SB709-QRS	[A]	C4
Q16	2SD601-QRS	[Y]	C4
Q17	2SB709-QRS	[A]	C4
Q18	2SD601-QRS	[Y]	C4
Q19	2SD601-QRS	[Y]	D4
Q20	2SB709-QRS	[A]	A4
Q30	2SB709-QRS	[A]	C7, D7
Q31	2SD601-QRS	[Y]	C6
Q32	2SD1030-RST	[1Z]	D6
Q33	2SB709-QRS	[A]	B6
Q34	2SB709-QRS	[A]	A6
Q35	2SD601-QRS	[Y]	B6
Q40	2SA564-QRS		B5
D3	MA151WK	[MT]	C6
D4	MA151WA	[MN]	B6
D5	MA151WK	[MT]	C6
D6	MA151WK	[MT]	B6
D7	MA151K	[MH]	A5
D8	MA151WA	[MN]	C3
D9	MA151K	[MH]	C3
D10	MA151K	[MH]	C4
D11	MA151K	[MH]	D4
D13	MA151WA	[MN]	C3
D16	MA151K	[MH]	D4


MICRO PROCESSOR BOARD
(YFVPKA2004EA)
WHITE SET SWITCH
SW101 WHITE SET
SW102 INDOOR/OUTDOOR
CN4
WHITE SET SWITCH IN
GROUND
CN5
INDOOR/OUTDOOR SWITCH IN
GROUND
TO PROCESS BOARD.. BI1
CN6
VTR COMPATIBILITY SW IN
BATTERY WARNING (2) IN
TITLE COLOUR SELECT OUT
BATTERY WARNING (1) IN
LOW LIGHT SIGNAL IN
REC SIGNAL IN
REC/FADE SWITCH OUT
FADE SIGNAL IN
WHITE BALANCE SET SWITCH OUT
IC3
IC4
Q19 FADE SIGNAL DISPLAY
Q18 BACK UP BATTERY WARNING
Q15,Q16,Q17 FADE SIGNAL CONTROL
VR1 CHARACTER SIZE
IC1
IC2
TITLE COLOUR
V.SYNC
H.SYNC
EXT TITLE POLARITY
TITLE COLOUR SELECT
Q1,Q3,Q4,Q5 CHARACTER SELECT
Q8 SERIAL DATA CONTROL AMP
Q40 POWER ON/OFF SWITCH
TP1 (TIMER CLOCK)
CT1 TIMER FREQ. ADJ
Q10,Q11 TIMER COUNTER SELE
Q9,Q34 CAMERA POWER ON/OFF DETECT
Q20 TIMER COUNT PULSE AMP
Q12 STANDBY DETECT
Q14 REC FADE DETECT
Z1 150K(x12)
Z2 8.2K(x6)
Z3 8.2K(x6)
Z4 150K(x12)
Z5 68K(x8)
DISPLAY KEY BOARD[B] (YFVAKA0162AN)
SHIFT RIGHT
WORD SELECT SEQUENCE
WORD SELECT REV SEQUENCE
INSERT
SHIFT LEFT
EXT TITLE
DATE/TIME SHIFT/WORD L/S
TITLE PRE
DATE/TIME PRE/START, START
DATE/TIME SET, DELETE
NEG/POS
TAPE COUNTER DELETE
TAPE COUNTER RESET, TITLE, CLR.
TAPE COUNTER MEMORY, KEY.
CN2
SHIFT/WORD SELE/TAPE COUNT P23 11
RIGHT P70 10
SEQUENCE P72 9
REV SEQ P73 8
INSERT/EXT TITLE/SHIFT P63 7
LEFT P71 6
TITLE/DATE P22 5
NEG/POS/EXT TITLE P21 4
DATE SET/DELETE/NEG/POS P62 3
DATE START/TAPE RESET P61 2
TITLE PRESET/TAPE MEMORY P60 1
LAP/RESET SLOW
START, STOP
PLAY, NORMAL
FWD, DATE, CHECK
REW, TIME, STOPWATCH SUBTITLE
TITLE 1, 2
CN1
STOPWATCH RESET/PLAY P60 8
DATE/STOP WATCH START P61 7
TIME P62 6
STOPWATCH START/RESET P21 5
REC/PLAY SELECT P22 4
REC/PLAY SELECT P71 3
TITLE 1, 2 P63 2
TITLE 1, 2/DATE/NORMAL/TIME P20 1
DISPLAY KEY BOARD[A] (YFVAKA0163AN)
TO PROCESS BOARD.. BI3
CN7
+4.8V IN (STANDBY 1&2:0V)
+1.8V IN
R-YL DETECTION IN
B-YL DETECTION IN
V. PULSE FOR TIMER IN
BLUE GAIN CONTROL OUT
RED GAIN CONTROL OUT
NOT USED
REC/FADE SWITCH IN
STANDBY OUT
REC/FADE SW
D
C
B
A
1
2
3
4
5
6

IC003

Pin No.	High	Low
①	WHITE SET	NORMAL
②	PLAYBACK	REC
③		
④	INDOOR	OUTDOOR
⑤	REC	PLAYBACK
⑥	REC	REVIEW
⑦	LOW LIGHT	NORMAL

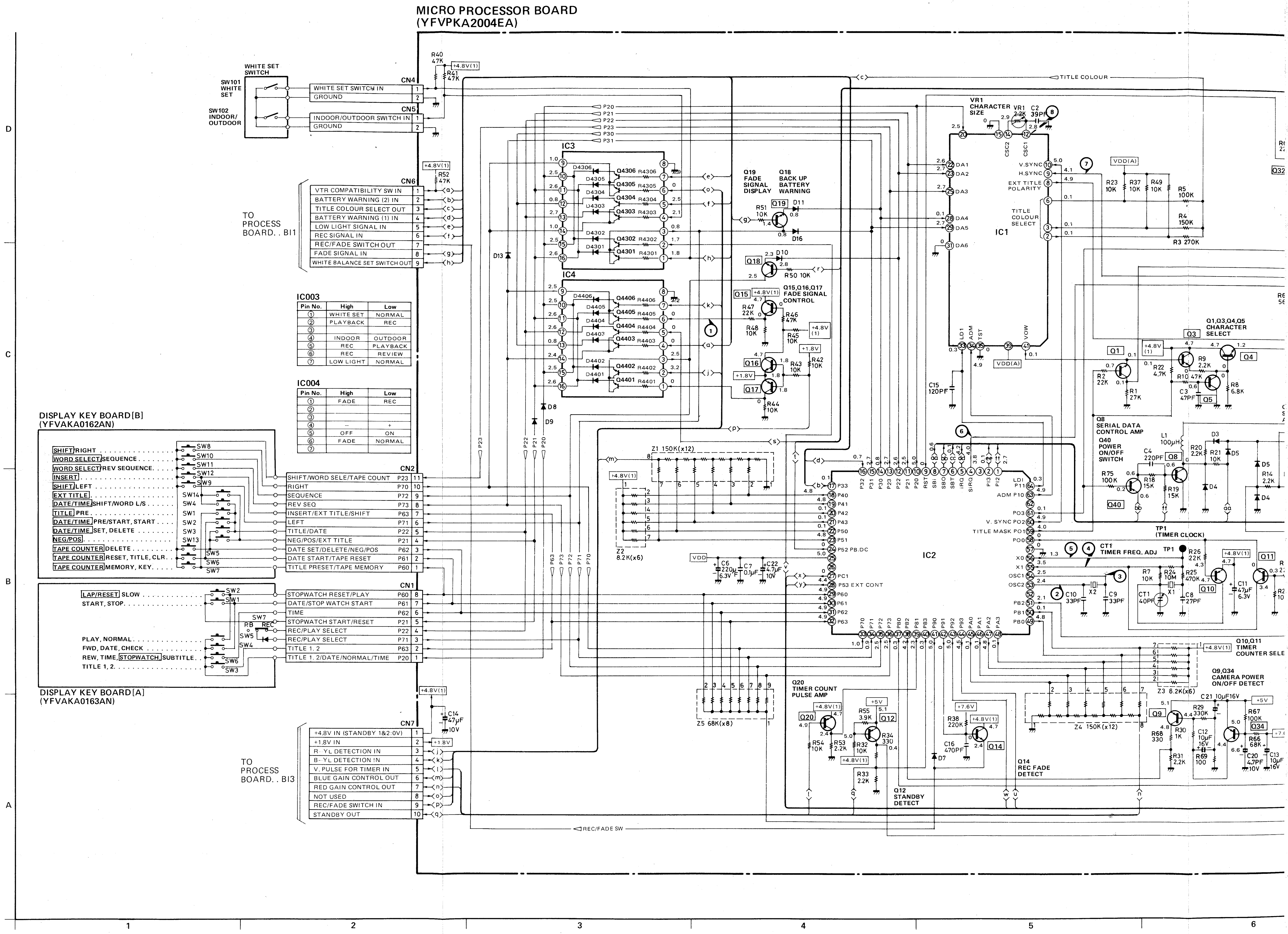
IC004

Pin No.	High	Low
①	FADE	REC
②		
③		
④	–	+
⑤	OFF	ON
⑥	FADE	NORMAL
⑦		

SCHEMATIC DIAGRAM OF MICRO PROCESSOR BOARD (YFVPKA2004EA)

MICRO PROCESSOR BOARD

IC1	MN1237B		D5
IC2	MN1554CVB		B5
IC3	AN90B82S		D3
IC4	AN90B82S		C3
Q1	2SC2404-CD	[U]	C5
Q2	2SB709-QRS	[A]	C7
Q3	2SD601-QRS	[Y]	C6
Q4	2SD601-QRS	[Y]	C6
Q5	2SD601-QRS	[Y]	C6
Q6	2SD601-QRS	[Y]	B6
Q7	2SD601-QRS	[Y]	B6
Q8	2SD601-QRS	[Y]	B6
Q9	2SB814-RS	[1B]	A6
Q10	2SA1022-CD	[E]	B6
Q11	2SC2404-CD	[U]	B6
Q12	2SB709-QRS	[A]	A4
Q13	2SD602-QRS	[W]	B6
Q14	2SD601-QRS	[Y]	A5
Q15	2SB709-QRS	[A]	C4
Q16	2SD601-QRS	[Y]	C4
Q17	2SB709-QRS	[A]	C4
Q18	2SD601-QRS	[Y]	C4
Q19	2SD601-QRS	[Y]	D4
Q20	2SB709-QRS	[A]	A4
Q30	2SB709-QRS	[A]	C7, D7
Q31	2SD601-QRS	[Y]	C6
Q32	2SD1030-RST	[1Z]	D6
Q33	2SB709-QRS	[A]	B6
Q34	2SB709-QRS	[A]	A6
Q35	2SD601-QRS	[Y]	B6
Q40	2SA564-QRS		B5
D3	MA151WK	[MT]	C6
D4	MA151WA	[MN]	B6
D5	MA151WK	[MT]	C6
D6	MA151WK	[MT]	B6
D7	MA151K	[MH]	A5
D8	MA151WA	[MN]	C3
D9	MA151K	[MH]	C3
D10	MA151K	[MH]	C4
D11	MA151K	[MH]	D4
D13	MA151WA	[MN]	C3
D16	MA151K	[MH]	D4



MICRO PROCESSOR BOARD (YFVPKA2004EA)
WHITE SET SWITCH
SW101 WHITE SET
SW102 INDOOR/OUTDOOR
CN4
WHITE SET SWITCH IN
GROUND
CN5
INDOOR/OUTDOOR SWITCH IN
GROUND
CN6
VTR COMPATIBILITY SW IN
BATTERY WARNING (2) IN
TITLE COLOUR SELECT OUT
BATTERY WARNING (1) IN
LOW LIGHT SIGNAL IN
REC SIGNAL IN
REC/FADE SWITCH OUT
FADE SIGNAL IN
WHITE BALANCE SET SWITCH OUT
TO PROCESS BOARD. . BI1
IC3
IC4
IC1
IC2
TITLE COLOUR
VR1 CHARACTER SIZE
Q19 FADE SIGNAL DISPLAY
Q18 BACK UP BATTERY WARNING
Q15,Q16,Q17 FADE SIGNAL CONTROL
Q1,Q3,Q4,Q5 CHARACTER SELECT
Q8 SERIAL DATA CONTROL AMP
Q40 POWER ON/OFF SWITCH
TP1 (TIMER CLOCK)
CT1 TIMER FREQ. ADJ
Q10,Q11 TIMER COUNTER SELE
Q9,Q34 CAMERA POWER ON/OFF DETECT
Q20 TIMER COUNT PULSE AMP
Q12 STANDBY DETECT
Q14 REC FADE DETECT
Z1 150K(x12)
Z2 8.2K(x6)
Z3 8.2K(x6)
Z4 150K(x12)
Z5 68K(x8)
DISPLAY KEY BOARD[B] (YFVAKA0162AN)
SHIFT RIGHT
WORD SELECT SEQUENCE
WORD SELECT REV SEQUENCE
INSERT
SHIFT LEFT
EXT TITLE
DATE/TIME SHIFT/WORD L/S
TITLE PRE
DATE/TIME PRE/START, START
DATE/TIME SET, DELETE
NEG/POS
TAPE COUNTER DELETE
TAPE COUNTER RESET, TITLE, CLR.
TAPE COUNTER MEMORY, KEY.
CN2
SHIFT/WORD SELE/TAPE COUNT P23
RIGHT P70
SEQUENCE P72
REV SEQ P73
INSERT/EXT TITLE/SHIFT P63
LEFT P71
TITLE/DATE P22
NEG/POS/EXT TITLE P21
DATE SET/DELETE/NEG/POS P62
DATE START/TAPE RESET P61
TITLE PRESET/TAPE MEMORY P60
DISPLAY KEY BOARD[A] (YFVAKA0163AN)
LAP/RESET SLOW
START, STOP.
PLAY, NORMAL.
FWD, DATE, CHECK
REW, TIME, STOPWATCH SUBTITLE.
TITLE 1, 2.
CN1
STOPWATCH RESET/PLAY P60
DATE/STOP WATCH START P61
TIME P62
STOPWATCH START/RESET P21
REC/PLAY SELECT P22
REC/PLAY SELECT P71
TITLE 1. 2 P63
TITLE 1. 2/DATE/NORMAL/TIME P20
CN7
+4.8V IN (STANDBY 1&2:0V)
+1.8V IN
R- YL DETECTION IN
B- YL DETECTION IN
V. PULSE FOR TIMER IN
BLUE GAIN CONTROL OUT
RED GAIN CONTROL OUT
NOT USED
REC/FADE SWITCH IN
STANDBY OUT
TO PROCESS BOARD. . BI3
REC/FADE SW
1
2
3
4
5
6
A
B
C
D

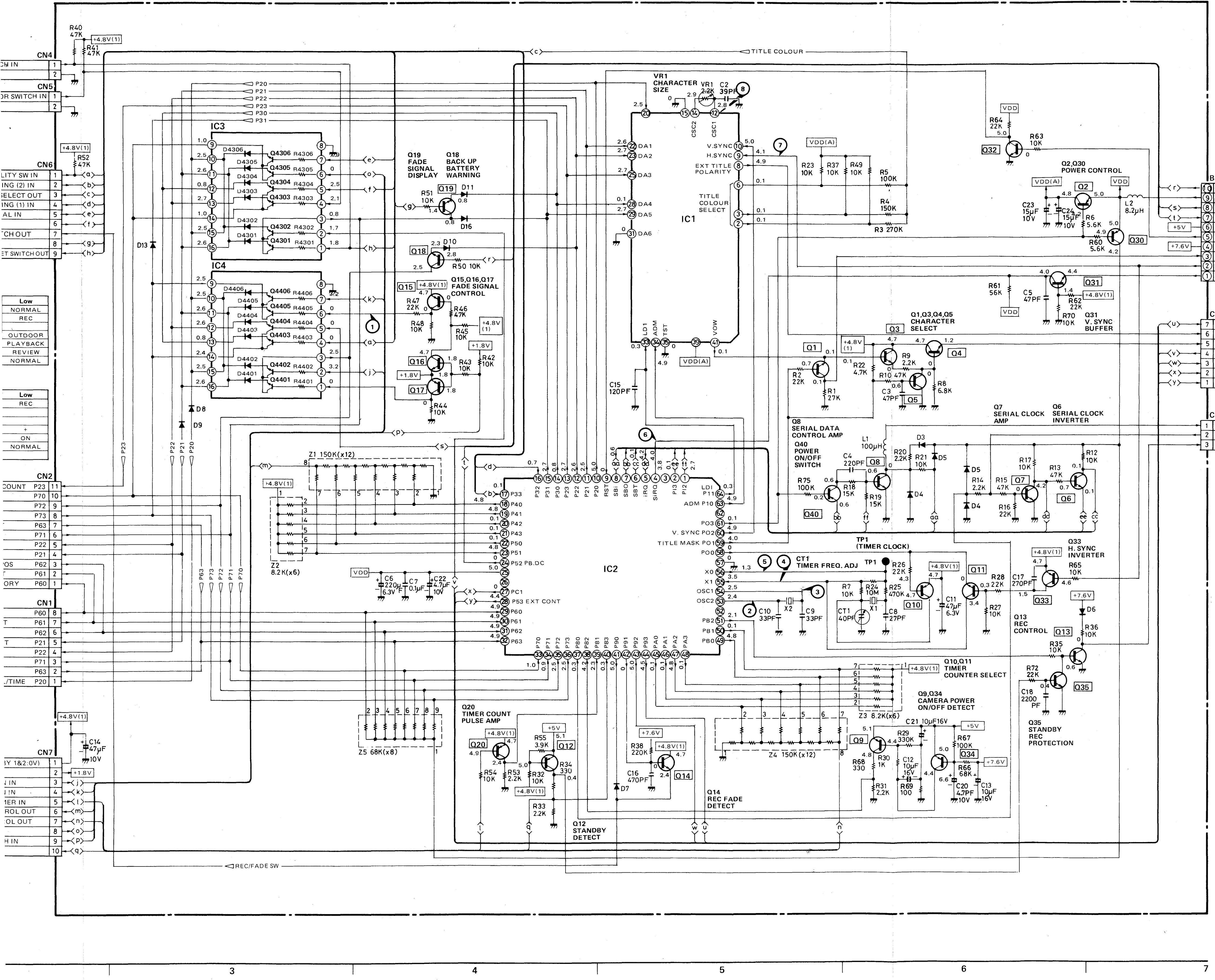
IC003

Pin No.	High	Low
①	WHITE SET	NORMAL
②	PLAYBACK	REC
③		
④	INDOOR	OUTDOOR
⑤	REC	PLAYBACK
⑥	REC	REVIEW
⑦	LOW LIGHT	NORMAL

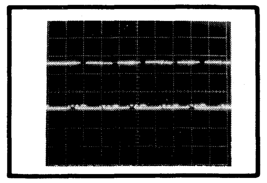
IC004

Pin No.	High	Low
①	FADE	REC
②		
③		
④	–	+
⑤	OFF	ON
⑥	FADE	NORMAL
⑦		

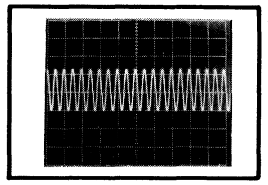
SCHEMATIC DIAGRAM OF MICRO PROCESSOR BOARD (YFVPKA2004EA)


MICRO PROCESSOR BOARD
(YFVPKA2004EA)
CN4
CN5
CN6
CN2
CN1
CN7
IC1
IC2
IC3
IC4
VR1 CHARACTER SIZE
Q19 FADE SIGNAL DISPLAY
Q18 BACK UP BATTERY WARNING
Q15,Q16,Q17 FADE SIGNAL CONTROL
Q2,Q30 POWER CONTROL
Q1,Q3,Q4,Q5 CHARACTER SELECT
Q31 V. SYNC BUFFER
Q7 SERIAL CLOCK AMP
Q6 SERIAL CLOCK INVERTER
Q8 SERIAL DATA CONTROL AMP
Q40 POWER ON/OFF SWITCH
TP1 (TIMER CLOCK)
CT1 TIMER FREQ. ADJ
Q33 H. SYNC INVERTER
Q13 REC CONTROL
Q10,Q11 TIMER COUNTER SELECT
Q9,Q34 CAMERA POWER ON/OFF DETECT
Q35 STANDBY REC PROTECTION
Q20 TIMER COUNT PULSE AMP
Q12 STANDBY DETECT
Q14 REC FADE DETECT
TITLE COLOUR
REC/FADE SW
BI1
BACK-UP WARNING IN
VDD IN
BEAM DETECT IN
PLAYBACK CONTROL OUT
+5V IN
CPU RESET IN
+7.6V IN
CHARACTER OUT
H. SYNC IN
V. SYNC IN
TO DEFLECTION BOARD.. CN6
CN8
NEG/POS CONTROL OUT
EXT TITLE POLARITY OUT
EXT VIDEO OUT
PLAYBACK CONTROL IN
REC RESET OUT
TITLE COLOUR CORRECT OUT
EXT TITLE CONT OUT
TO PROCESS BOARD.. BI2
CN3
SERIAL DATA IN/OUT
SERIAL CLOCK IN
VTR REC CONTROL OUT
CN101 VTR CONNECTOR
Z1 150K(x12)
Z2 8.2K(x6)
Z3 8.2K(x6)
Z4 150K(x12)
Z5 68K(x8)
3
4
5
6
7

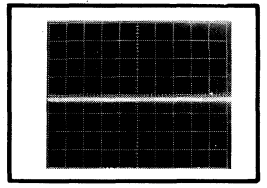
1 1V/DIV, 5ms/DIV



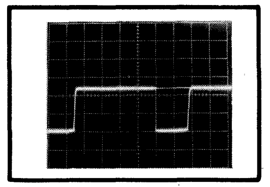
2 2V/DIV, 0.5μs/DIV



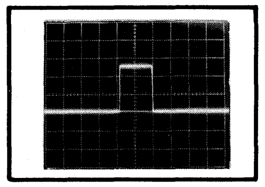
3 2V/DIV, 0.5μs/DIV



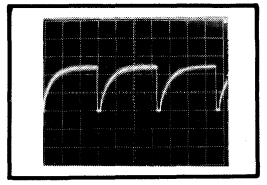
4 2V/DIV, 10μs/DIV



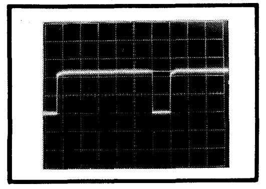
5 2V/DIV, 10μs/DIV



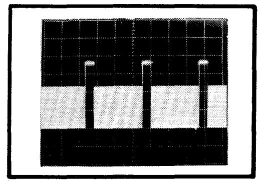
6 2V/DIV, 5ms/DIV



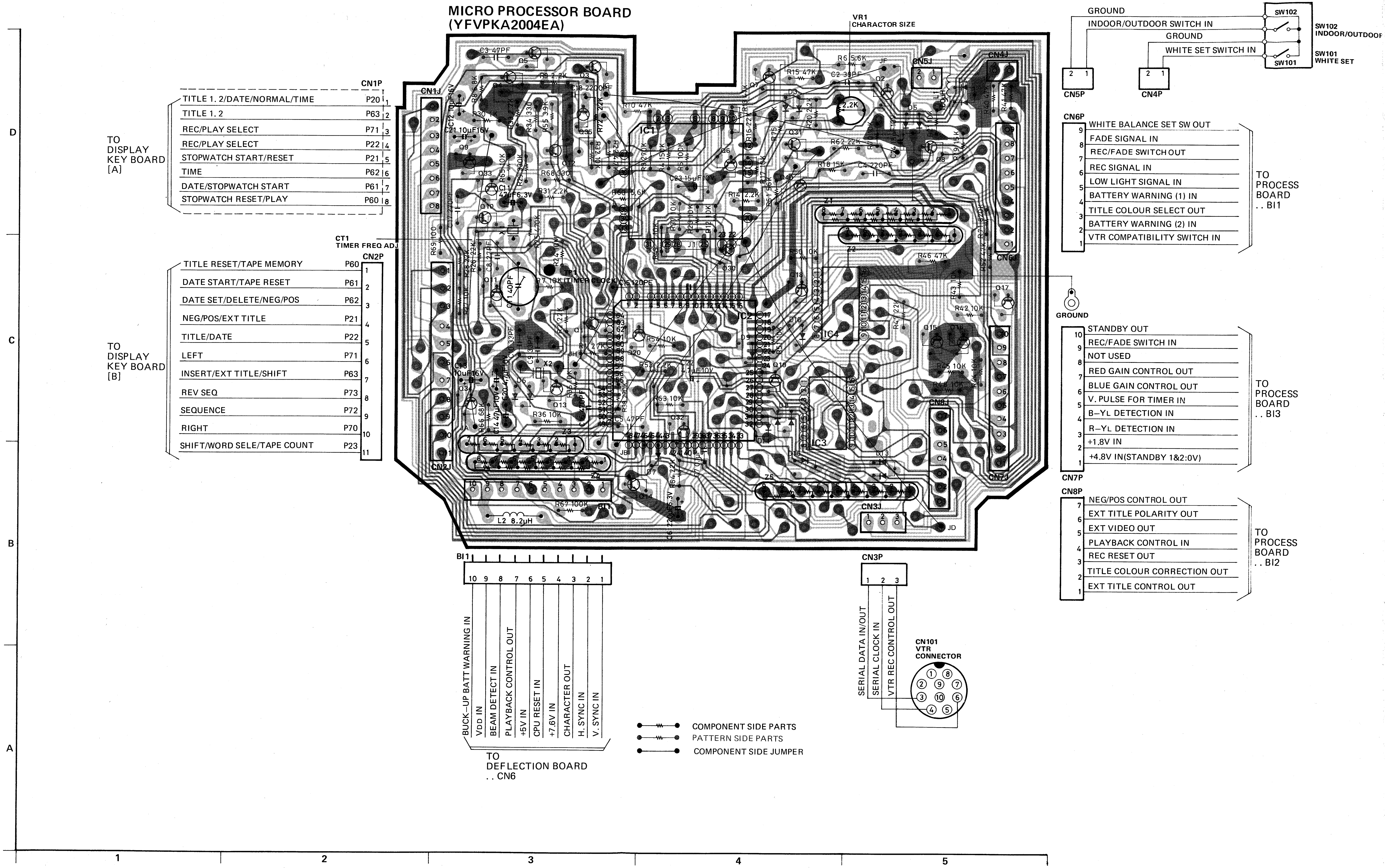
7 2V/DIV, 10μs/DIV



8 1V/DIV, 20μs/DIV

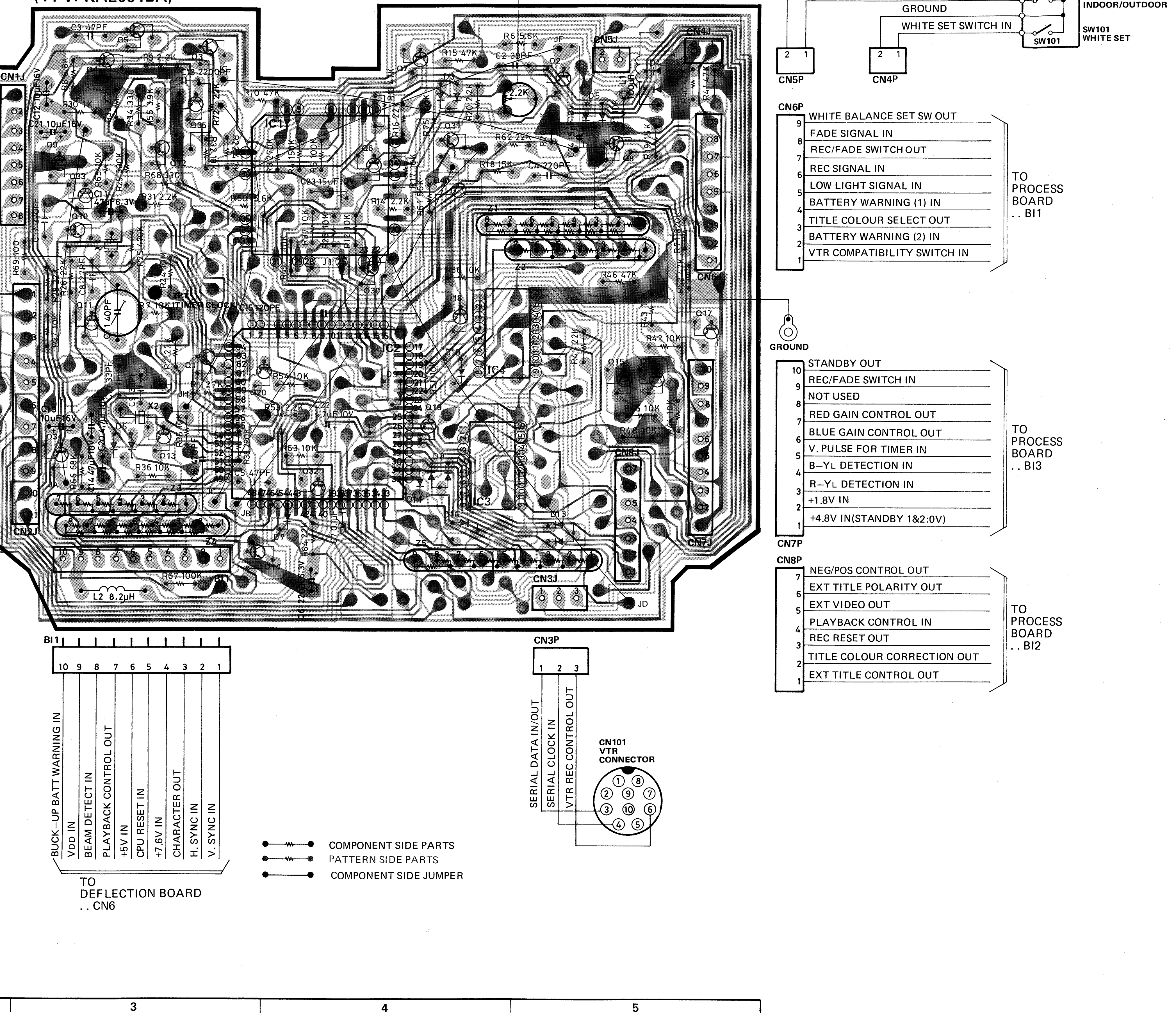


CONDUCTOR VIEW OF MICRO PROCESSOR BOARD (YFVPKA2004EA)

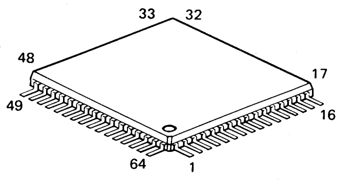

MICRO PROCESSOR BOARD (YFVPKA2004EA)
VR1 CHARACTOR SIZE
CN1P
TITLE 1. 2/DATE/NORMAL/TIME P20 1
TITLE 1. 2 P63 2
REC/PLAY SELECT P71 3
REC/PLAY SELECT P22 4
STOPWATCH START/RESET P21 5
TIME P62 6
DATE/STOPWATCH START P61 7
STOPWATCH RESET/PLAY P60 8
TO DISPLAY KEY BOARD [A]
CT1 TIMER FREQ ADJ
CN2P
TITLE RESET/TAPE MEMORY P60 1
DATE START/TAPE RESET P61 2
DATE SET/DELETE/NEG/POS P62 3
NEG/POS/EXT TITLE P21 4
TITLE/DATE P22 5
LEFT P71 6
INSERT/EXT TITLE/SHIFT P63 7
REV SEQ P73 8
SEQUENCE P72 9
RIGHT P70 10
SHIFT/WORD SELE/TAPE COUNT P23 11
TO DISPLAY KEY BOARD [B]
GROUND
INDOOR/OUTDOOR SWITCH IN
GROUND
WHITE SET SWITCH IN
SW102
SW101
SW102 INDOOR/OUTDOOR
SW101 WHITE SET
CN5P
CN4P
CN6P
9 WHITE BALANCE SET SW OUT
8 FADE SIGNAL IN
7 REC/FADE SWITCH OUT
6 REC SIGNAL IN
5 LOW LIGHT SIGNAL IN
4 BATTERY WARNING (1) IN
3 TITLE COLOUR SELECT OUT
2 BATTERY WARNING (2) IN
1 VTR COMPATIBILITY SWITCH IN
TO PROCESS BOARD .. BI1
GROUND
CN7P
10 STANDBY OUT
9 REC/FADE SWITCH IN
8 NOT USED
7 RED GAIN CONTROL OUT
6 BLUE GAIN CONTROL OUT
5 V. PULSE FOR TIMER IN
4 B–YL DETECTION IN
3 R–YL DETECTION IN
2 +1.8V IN
1 +4.8V IN(STANDBY 1&2:0V)
TO PROCESS BOARD .. BI3
CN8P
7 NEG/POS CONTROL OUT
6 EXT TITLE POLARITY OUT
5 EXT VIDEO OUT
4 PLAYBACK CONTROL IN
3 REC RESET OUT
2 TITLE COLOUR CORRECTION OUT
1 EXT TITLE CONTROL OUT
TO PROCESS BOARD .. BI2
BI1
10 BUCK–UP BATT WARNING IN
9 VDD IN
8 BEAM DETECT IN
7 PLAYBACK CONTROL OUT
6 +5V IN
5 CPU RESET IN
4 +7.6V IN
3 CHARACTER OUT
2 H. SYNC IN
1 V. SYNC IN
TO DEFLECTION BOARD .. CN6
CN3P
1 SERIAL DATA IN/OUT
2 SERIAL CLOCK IN
3 VTR REC CONTROL OUT
CN101 VTR CONNECTOR
CN1J
CN2J
CN3J
CN4J
CN5J
CN6J
CN7J
CN8J
IC1
IC2
IC3
IC4
L2 8.2µH
R67 100K
COMPONENT SIDE PARTS
PATTERN SIDE PARTS
COMPONENT SIDE JUMPER
D
C
B
A
1
2
3
4
5

CONDUCTOR VIEW OF MICRO PROCESSOR BOARD (YFVPKA2004EA)

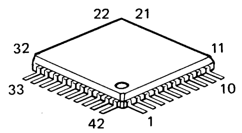
MICRO PROCESSOR BOARD
(YFVPKA2004EA)


VR1
CHARACTOR SIZE
CN1J
CN2J
CN3J
CN4J
CN5J
CN6J
CN7J
CN8J
IC1
IC2
IC3
IC4
Z1
Z2
Z3
Z4
Z5
JD
L2 8.2μH
R67 100K
GROUND
INDOOR/OUTDOOR SWITCH IN
GROUND
WHITE SET SWITCH IN
SW102
SW102
INDOOR/OUTDOOR
SW101
WHITE SET
CN5P
CN4P
CN6P
9 WHITE BALANCE SET SW OUT
8 FADE SIGNAL IN
7 REC/FADE SWITCH OUT
6 REC SIGNAL IN
5 LOW LIGHT SIGNAL IN
4 BATTERY WARNING (1) IN
3 TITLE COLOUR SELECT OUT
2 BATTERY WARNING (2) IN
1 VTR COMPATIBILITY SWITCH IN
TO PROCESS BOARD . . BI1
GROUND
10 STANDBY OUT
9 REC/FADE SWITCH IN
8 NOT USED
7 RED GAIN CONTROL OUT
6 BLUE GAIN CONTROL OUT
5 V. PULSE FOR TIMER IN
4 B–YL DETECTION IN
3 R–YL DETECTION IN
2 +1.8V IN
1 +4.8V IN(STANDBY 1&2:0V)
CN7P
TO PROCESS BOARD . . BI3
CN8P
7 NEG/POS CONTROL OUT
6 EXT TITLE POLARITY OUT
5 EXT VIDEO OUT
4 PLAYBACK CONTROL IN
3 REC RESET OUT
2 TITLE COLOUR CORRECTION OUT
1 EXT TITLE CONTROL OUT
TO PROCESS BOARD . . BI2
BI1
10 9 8 7 6 5 4 3 2 1
BUCK–UP BATT WARNING IN
VDD IN
BEAM DETECT IN
PLAYBACK CONTROL OUT
+5V IN
CPU RESET IN
+7.6V IN
CHARACTER OUT
H. SYNC IN
V. SYNC IN
TO DEFLECTION BOARD . . CN6
CN3P
1 2 3
SERIAL DATA IN/OUT
SERIAL CLOCK IN
VTR REC CONTROL OUT
CN101
VTR
CONNECTOR
COMPONENT SIDE PARTS
PATTERN SIDE PARTS
COMPONENT SIDE JUMPER
3
4
5

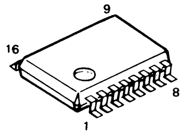
MN1554CVB


33 32
48
49
17
16
64 1

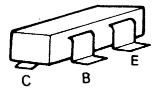
MN1237B


22 21
32
33
11
10
42 1

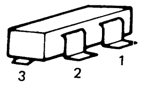
AN90B82S



2SD1030-RST
2SD602-QRS
2SD601-QRS
2SC2404-CD
2SB814-RS.
2SB709-QRS
2SA1022-CD

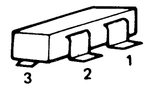


MA151K



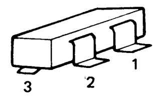
1 : NC
2 : Anode
3 : Cathode

MA151WK



1 : Anode
2 : Anode
3 : Cathode

MA151WA



1 : Cathode
2 : Cathode
3 : Anode

MICRO PROCESSOR BOARD

IC1	MN1237B		D4
IC2	MN1554CVB		C4
IC3	AN90B82S		C4
IC4	AN90B82S		C4
Q1	2SC2404-CD	[U]	C3
Q2	2SB709-QRS	[A]	D5
Q3	2SD601-QRS	[Y]	D3
Q4	2SD601-QRS	[Y]	D3
Q5	2SD601-QRS	[Y]	D3
Q6	2SD601-QRS	[Y]	D4
Q7	2SD601-QRS	[Y]	D4
Q8	2SD601-QRS	[Y]	D5
Q9	2SB814-RS	[1B]	D3
Q10	2SA1022-CD	[E]	D3
Q11	2SC2404-CD	[U]	C3
Q12	2SB709-QRS	[A]	D3
Q13	2SD602-QRS	[W]	C3
Q14	2SD601-QRS	[Y]	B3, B4
Q15	2SB709-QRS	[A]	C5
Q16	2SD601-QRS	[Y]	C5
Q17	2SB709-QRS	[A]	C5
Q18	2SD601-QRS	[Y]	C4
Q19	2SD601-QRS	[Y]	C4
Q20	2SB709-QRS	[A]	C3, C4
Q30	2SB709-QRS	[A]	C4
Q31	2SD601-QRS	[Y]	D4
Q32	2SD1030-RST	[1Z]	C4
Q33	2SB709-QRS	[A]	D3
Q34	2SB709-QRS	[A]	C3
Q35	2SD601-QRS	[Y]	D3
Q40	2SA564-QRS		D4
D3	MA151WK	[MT]	D4
D4	MA151WA	[MN]	D5
D5	MA151WK	[MT]	D5
D6	MA151WK	[MT]	C3
D7	MA151K	[MH]	B4
D8	MA151WA	[MN]	C4
D9	MA151K	[MH]	C4
D10	MA151K	[MH]	C4
D11	MA151K	[MH]	C4
D13	MA151WA	[MN]	B5
D16	MA151K	[MH]	B4

PRODUCT SAFETY NOTE

The shaded area on this schematic diagram incorporates special features important for protection from X-Radiation, fire and electrical shock hazards. When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

DEFLECTION BOARD

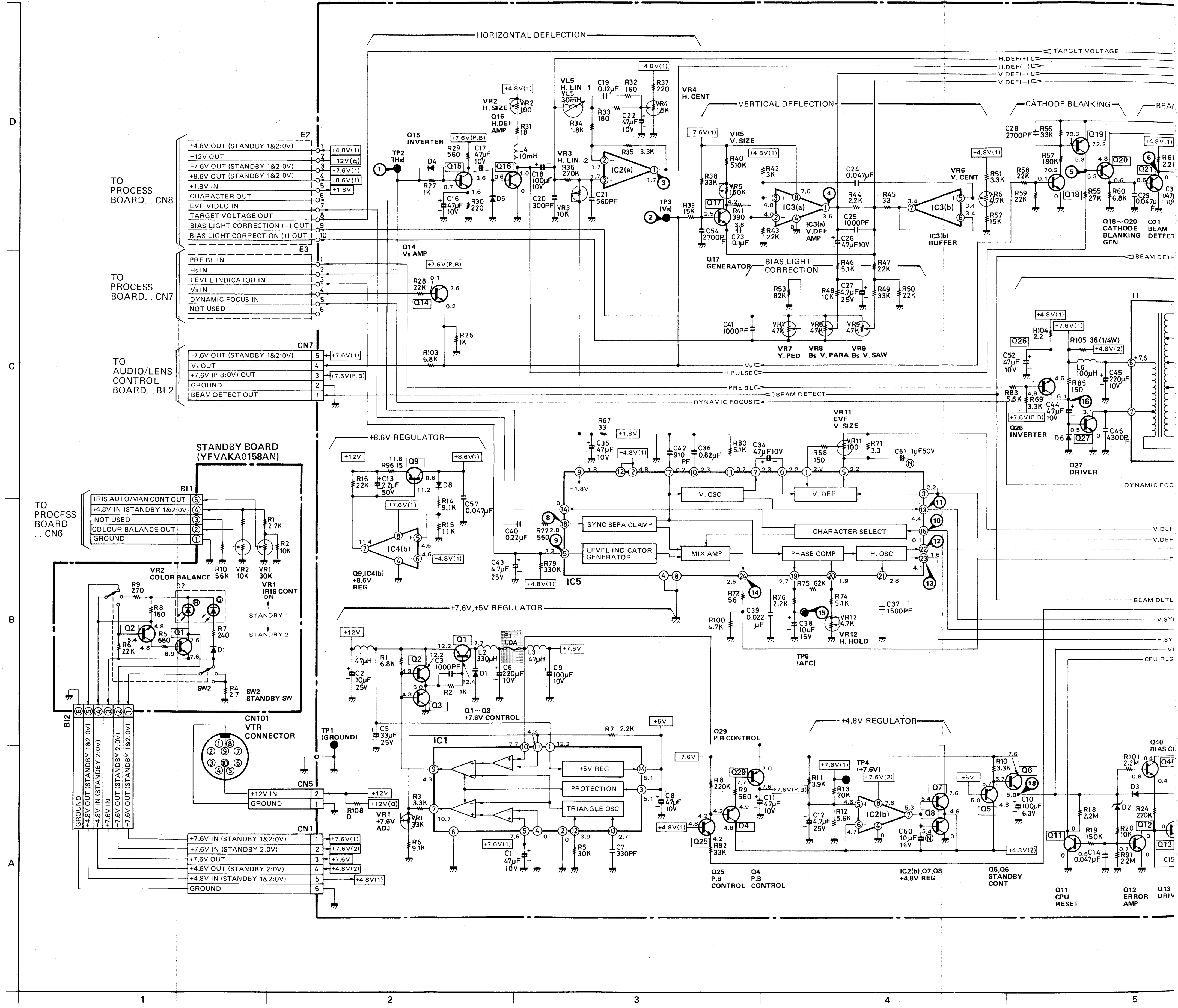
IC1	NJM2048MC		A2
IC2	NJM3415M		A4,D3
IC3	NJM3415M		D4
IC4	NJM2903M		B2,B6
IC5	AN2510S		C3,B3
Q1	2SB837-CD		B2
Q2	2SD601-QRS	[Y]	B2
Q3	2SB709-QRS	[A]	B2
Q4	2SB709-QRS	[A]	A3
Q5	2SB709-QRS	[A]	A4
Q6	2SD601-QRS	[Y]	A5
Q7	2SD973-QRS		A4
Q8	2SB710-QRS	[C]	A4
Q9	2SB710-QRS	[C]	C2
Q11	2SD1030RST	[1Z]	A5
Q12	2SC2404-CD	[U]	A5
Q13	2SD1030-T	[1Z]	A5
Q14	2SD601-QRS	[Y]	C2
Q15	2SD602-QRS	[W]	D2
Q16	2SD1083		D2
Q17	2SC2405STU	[S]	D3
Q18	2SD814-QRS	[P]	D5
Q19	2SB814-QRS	[1B]	D5
Q20	2SB814-QRS	[1B]	D5
Q21	2SD601-QRS	[Y]	D5
Q22	2SB814-RS	[1B]	D6
Q24	2SB709-QRS	[A]	A6
Q25	2SD601-QRS	[Y]	A3
Q26	2SD602-QRS	[W]	C5
Q27	2SD1083		C5
Q29	2SB793-RS		A3
Q40	2SD1030RST	[1Z]	A5
D1	EK14		B2
D2	HZ3BLL		A5
D3	MA151K	[MH]	A5
D4	MA165		D2
D5	MA151K	[MH]	D2
D6	MA165		C5
D8	MA153	[MC]	C2

STANDBY BOARD

Q1	2SB793-QRS	B1
Q2	2SD636-QRS	B1
D1	MA165	B1
D2	LN11WP23F	B1

SCHEMATIC DIAGRAM OF DEFLECTION BOARD (YFVPKA2001EA)

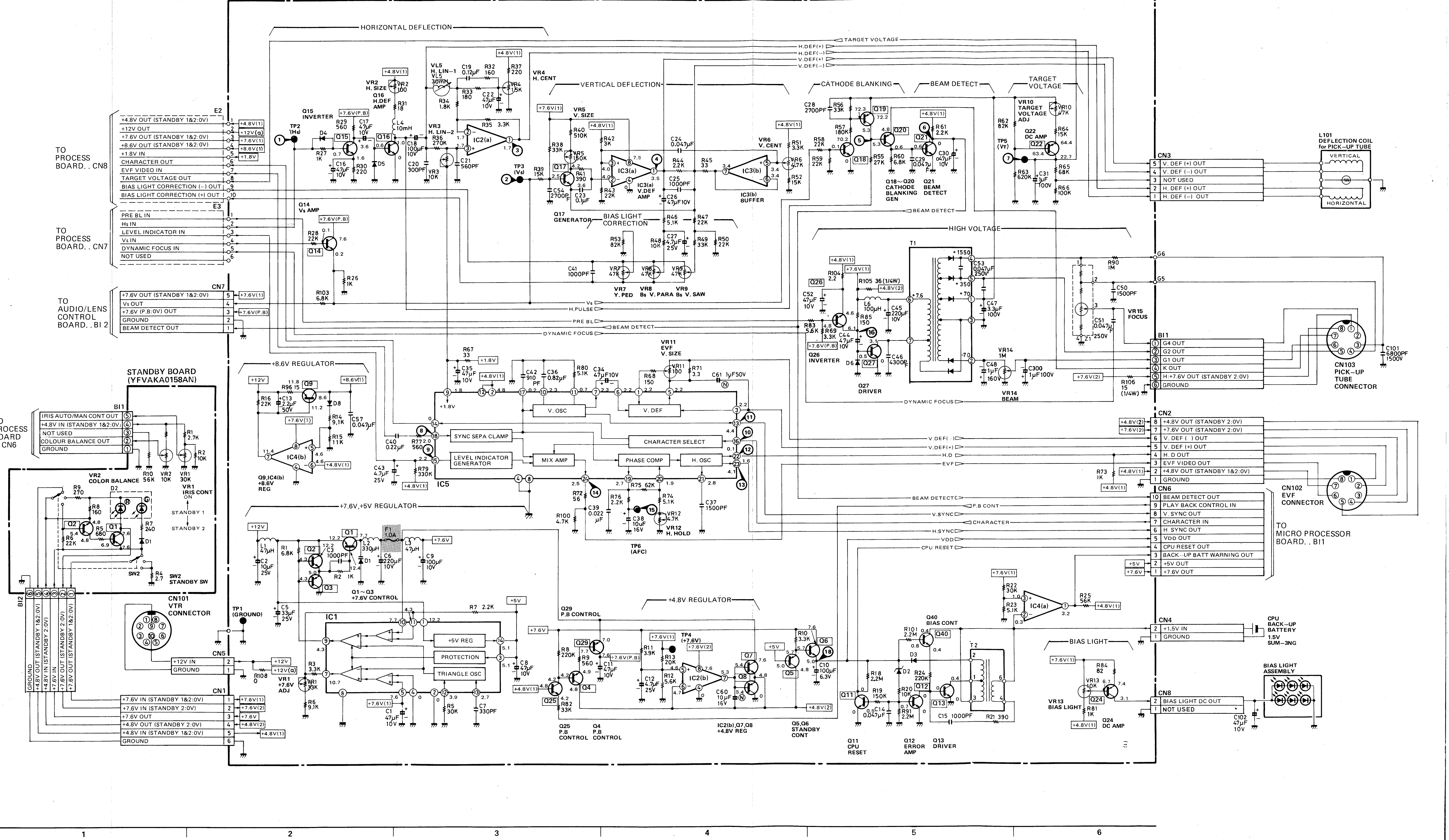
DEFLECTION BOARD
(YFVPKA2001EA)



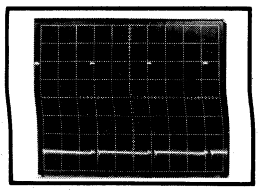
HORIZONTAL DEFLECTION
VERTICAL DEFLECTION
CATHODE BLANKING
TARGET VOLTAGE
H.DEF(+)
H.DEF(−)
V.DEF(+)
V.DEF(−)
TO PROCESS BOARD. . CN8
E2
+4.8V OUT (STANDBY 1&2:0V)
+12V OUT
+7.6V OUT (STANDBY 1&2:0V)
+8.6V OUT (STANDBY 1&2:0V)
+1.8V IN
CHARACTER OUT
EVF VIDEO IN
TARGET VOLTAGE OUT
BIAS LIGHT CORRECTION (−) OUT
BIAS LIGHT CORRECTION (+) OUT
E3
TO PROCESS BOARD. . CN7
PRE BL IN
Hs IN
LEVEL INDICATOR IN
Vs IN
DYNAMIC FOCUS IN
NOT USED
CN7
TO AUDIO/LENS CONTROL BOARD. . BI 2
+7.6V OUT (STANDBY 1&2:0V)
Vs OUT
+7.6V (P.B:0V) OUT
GROUND
BEAM DETECT OUT
STANDBY BOARD (YFVAKA0158AN)
BI1
TO PROCESS BOARD . . CN6
IRIS AUTO/MAN CONT OUT
+4.8V IN (STANDBY 1&2:0V)
NOT USED
COLOUR BALANCE OUT
GROUND
VR2 COLOR BALANCE
VR1 IRIS CONT
ON
STANDBY 1
STANDBY 2
SW2 STANDBY SW
BI2
GROUND
+4.8V OUT (STANDBY 1&2:0V)
+4.8V IN (STANDBY 2:0V)
+7.6V IN
+7.6V OUT (STANDBY 2:0V)
+7.6V OUT (STANDBY 1&2:0V)
CN101 VTR CONNECTOR
TP1 (GROUND)
CN5
+12V IN
GROUND
CN1
+7.6V IN (STANDBY 1&2:0V)
+7.6V IN (STANDBY 2:0V)
+7.6V OUT
+4.8V OUT (STANDBY 2:0V)
+4.8V IN (STANDBY 1&2:0V)
GROUND
TP2 (Hs)
Q15 INVERTER
Q16 H.DEF AMP
VR2 H. SIZE
VL5 H. LIN−1
VR3 H. LIN−2
VR4 H. CENT
IC2(a)
TP3 (Vs)
Q14 Vs AMP
VR5 V. SIZE
Q17 GENERATOR
IC3(a) V.DEF AMP
BIAS LIGHT CORRECTION
VR6 V. CENT
IC3(b) BUFFER
VR7 Y.PED
VR8 Bs V. PARA
VR9 Bs V. SAW
Q18∼Q20 CATHODE BLANKING GEN
Q21 BEAM DETECT
BEAM DETECT
Q26 INVERTER
Q27 DRIVER
T1
DYNAMIC FOCUS
Vs
H.PULSE
PRE BL
DYNAMIC FOCUS
+8.6V REGULATOR
Q9,IC4(b) +8.6V REG
IC4(b)
VR11 EVF V. SIZE
V. OSC
V. DEF
SYNC SEPA CLAMP
CHARACTER SELECT
LEVEL INDICATOR GENERATOR
MIX AMP
PHASE COMP
H. OSC
IC5
TP6 (AFC)
VR12 H. HOLD
V.DEF
H.SY
CPU RES
+7.6V,+5V REGULATOR
F1 1.0A
Q1∼Q3 +7.6V CONTROL
IC1
+5V REG
PROTECTION
TRIANGLE OSC
VR1 +7.6V ADJ
+4.8V REGULATOR
Q29 P.B CONTROL
TP4 (+7.6V)
IC2(b)
Q25 P.B CONTROL
Q4 P.B CONTROL
IC2(b),Q7,Q8 +4.8V REG
Q5,Q6 STANDBY CONT
Q11 CPU RESET
Q12 ERROR AMP
Q40
D
C
B
A
1
2
3
4
5

SCHEMATIC DIAGRAM OF DEFLECTION BOARD (YFVPKA2001EA)

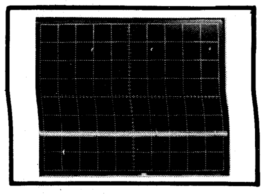
DEFLECTION BOARD
(YFVPKA2001EA)


HORIZONTAL DEFLECTION
VERTICAL DEFLECTION
CATHODE BLANKING
BEAM DETECT
TARGET VOLTAGE
HIGH VOLTAGE
+8.6V REGULATOR
+7.6V, +5V REGULATOR
+4.8V REGULATOR
BIAS LIGHT
BIAS LIGHT CORRECTION
TO PROCESS BOARD. . CN8
TO PROCESS BOARD. . CN7
TO AUDIO/LENS CONTROL BOARD. . BI 2
TO MICRO PROCESSOR BOARD. . BI1
STANDBY BOARD (YFVAKA0158AN)
E2
+4.8V OUT (STANDBY 1&2:0V)
+12V OUT
+7.6V OUT (STANDBY 1&2:0V)
+8.6V OUT (STANDBY 1&2:0V)
+1.8V IN
CHARACTER OUT
EVF VIDEO IN
TARGET VOLTAGE OUT
BIAS LIGHT CORRECTION (–) OUT
BIAS LIGHT CORRECTION (+) OUT
E3
PRE BL IN
Hs IN
LEVEL INDICATOR IN
Vs IN
DYNAMIC FOCUS IN
NOT USED
CN7
+7.6V OUT (STANDBY 1&2:0V)
Vs OUT
+7.6V (P.B:0V) OUT
GROUND
BEAM DETECT OUT
BI1
IRIS AUTO/MAN CONT OUT
+4.8V IN (STANDBY 1&2:0V)
NOT USED
COLOUR BALANCE OUT
GROUND
VR2 COLOR BALANCE
VR1 IRIS CONT
SW2 STANDBY SW
STANDBY 1
STANDBY 2
BI2
CN101 VTR CONNECTOR
CN5
+12V IN
GROUND
CN1
+7.6V IN (STANDBY 1&2:0V)
+7.6V IN (STANDBY 2:0V)
+7.6V OUT
+4.8V OUT (STANDBY 2:0V)
+4.8V IN (STANDBY 1&2:0V)
GROUND
TP1 (GROUND)
TP2 (Hs)
TP3 (Vs)
TP4 (+7.6V)
TP5 (VT)
TP6 (AFC)
Q15 INVERTER
Q16 H.DEF AMP
VR2 H. SIZE
VL5 H. LIN–1
VR3 H. LIN–2
VR4 H. CENT
IC2(a)
Q14 Vs AMP
Q17 GENERATOR
VR5 V. SIZE
IC3(a) V.DEF AMP
IC3(b) BUFFER
VR6 V. CENT
VR7 Y. PED
VR8 Bs V. PARA
VR9 Bs V. SAW
Q18~Q20 CATHODE BLANKING GEN
Q21 BEAM DETECT
VR10 TARGET VOLTAGE ADJ
Q22 DC AMP
H.DEF(+)
H.DEF(–)
V.DEF(+)
V.DEF(–)
TARGET VOLTAGE
BEAM DETECT
H.PULSE
PRE BL
DYNAMIC FOCUS
CN3
V. DEF (+) OUT
V. DEF (–) OUT
NOT USED
H. DEF (+) OUT
H. DEF (–) OUT
L101 DEFLECTION COIL for PICK–UP TUBE
VERTICAL
HORIZONTAL
T1
Q26 INVERTER
Q27 DRIVER
VR14 BEAM
VR15 FOCUS
G6
G5
BI1
G4 OUT
G2 OUT
G1 OUT
K OUT
H:+7.6V OUT (STANDBY 2:0V)
GROUND
CN103 PICK–UP TUBE CONNECTOR
VR11 EVF V. SIZE
IC5
V. OSC
V. DEF
SYNC SEPA CLAMP
LEVEL INDICATOR GENERATOR
MIX AMP
CHARACTER SELECT
PHASE COMP
H. OSC
VR12 H. HOLD
Q9,IC4(b) +8.6V REG
IC4(b)
V.DEF(–)
V.DEF(+)
H.D
EVF
CN2
+4.8V OUT (STANDBY 2:0V)
+7.6V OUT (STANDBY 2:0V)
V. DEF (–) OUT
V. DEF (+) OUT
H. D OUT
EVF VIDEO OUT
+4.8V OUT (STANDBY 1&2:0V)
GROUND
CN102 EVF CONNECTOR
CN6
BEAM DETECT OUT
PLAY BACK CONTROL IN
V. SYNC OUT
CHARACTER IN
H. SYNC OUT
VDD OUT
CPU RESET OUT
BACK–UP BATT WARNING OUT
+5V OUT
+7.6V OUT
P.B CONT
V.SYNC
CHARACTER
H.SYNC
VDD
CPU RESET
Q1~Q3 +7.6V CONTROL
F1 1.0A
IC1
+5V REG
PROTECTION
TRIANGLE OSC
VR1 +7.6V ADJ
Q29 P.B CONTROL
Q25 P.B CONTROL
Q4 P.B CONTROL
IC2(b),Q7,Q8 +4.8V REG
Q5,Q6 STANDBY CONT
Q11 CPU RESET
Q12 ERROR AMP
Q13 DRIVER
Q40 BIAS CONT
T2
IC4(a)
CN4
+1.5V IN
GROUND
CPU BACK–UP BATTERY 1.5V SUM–3NG
VR13 BIAS LIGHT
Q24 DC AMP
CN8
BIAS LIGHT DC OUT
NOT USED
BIAS LIGHT ASSEMBLY
1
2
3
4
5
6

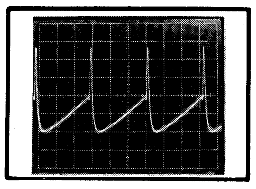
1 1V/DIV, 20µs/DIV



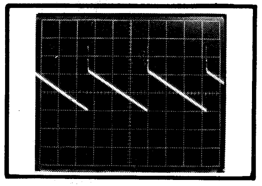
2 1V/DIV, 5ms/DIV



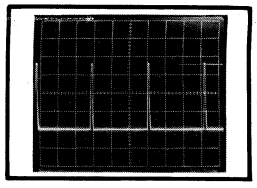
3 1V/DIV, 20µs/DIV



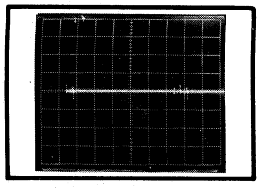
4 0.5V/DIV, 5ms/DIV



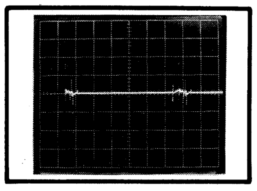
5 20V/DIV, 20µs/DIV



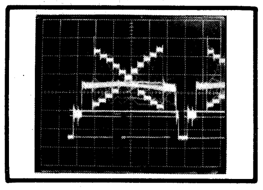
6 0.2V/DIV, 10µs/DIV



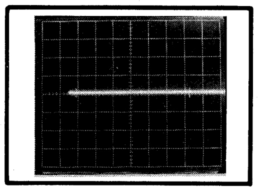
7 0.1V/DIV, 10µs/DIV



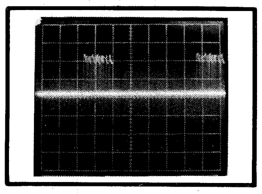
8 0.2V/DIV, 10µs/DIV



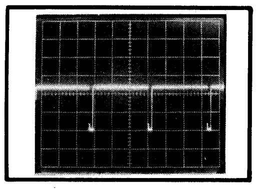
9 0.2V/DIV, 10µs/DIV



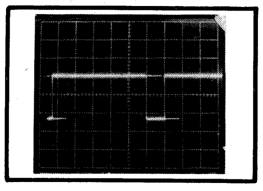
10 2V/DIV, 10µs/DIV



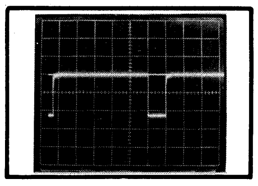
11 2V/DIV, 5ms/DIV



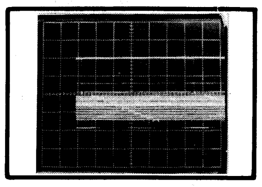
12 2V/DIV, 10µs/DIV



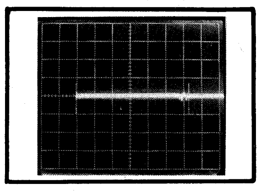
13 2V/DIV, 10µs/DIV



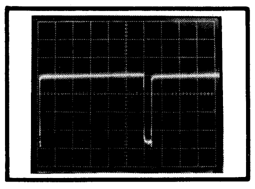
14 1V/DIV, 10µs/DIV



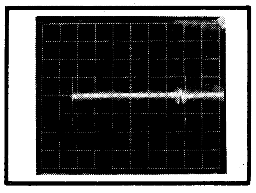
15 50mV/DIV, 10µs/DIV



16 0.5V/DIV, 10µs/DIV

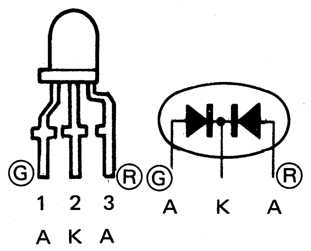


18 20mV/DIV, 10µs/DIV

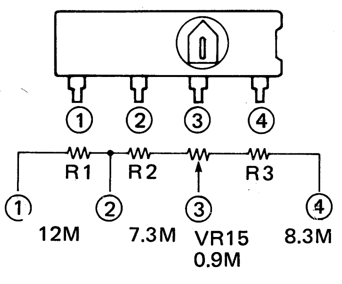


CONDUCTOR V

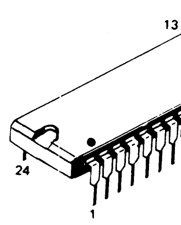
STANDBY BOARD
LN11WP23F


G
R
G
R
1 2 3
A K A
A K A

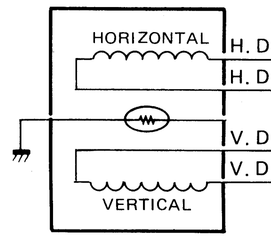
BLOCK RESISTOR
EVM78GA00115

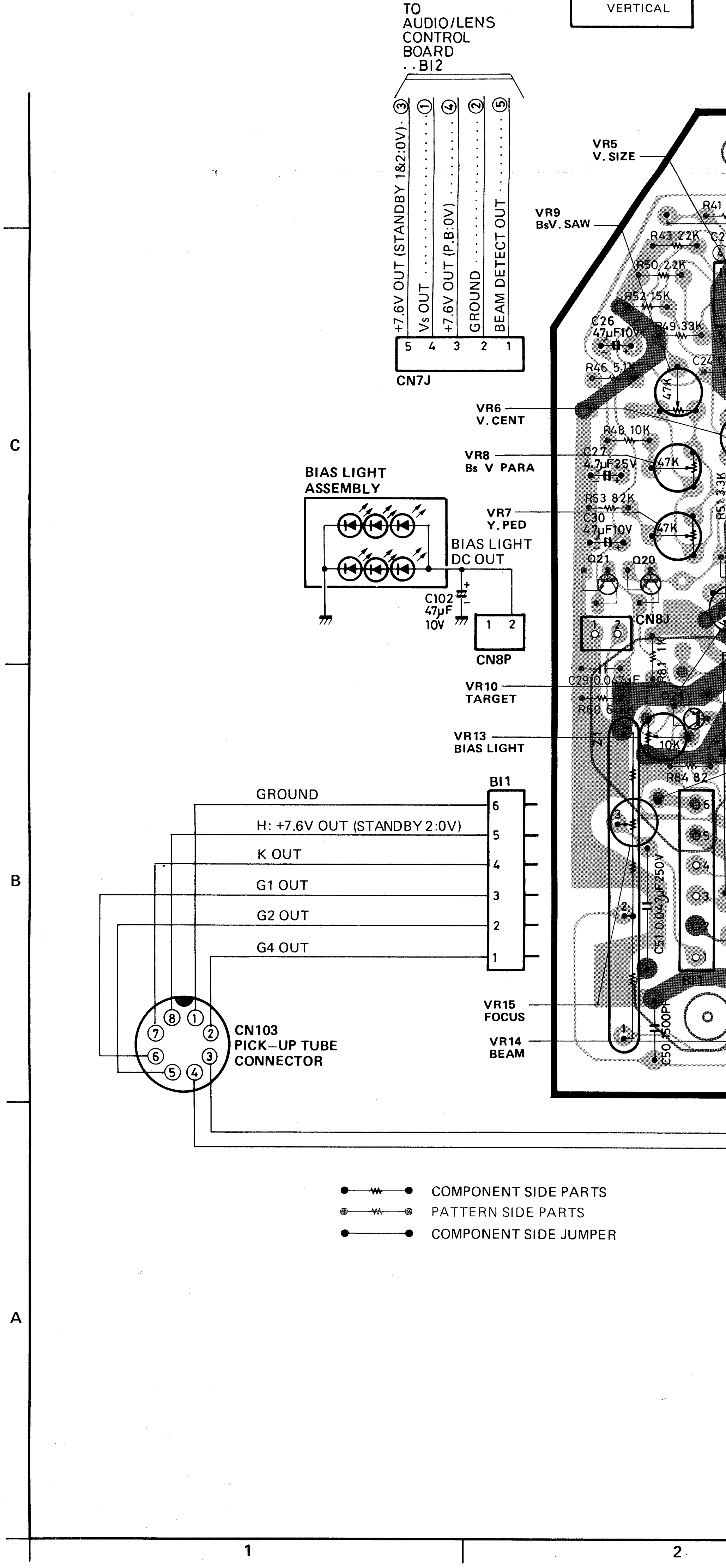

① ② ③ ④
R1
R2
R3
①
②
③
④
12M
7.3M
VR15
0.9M
8.3M

AN2510S



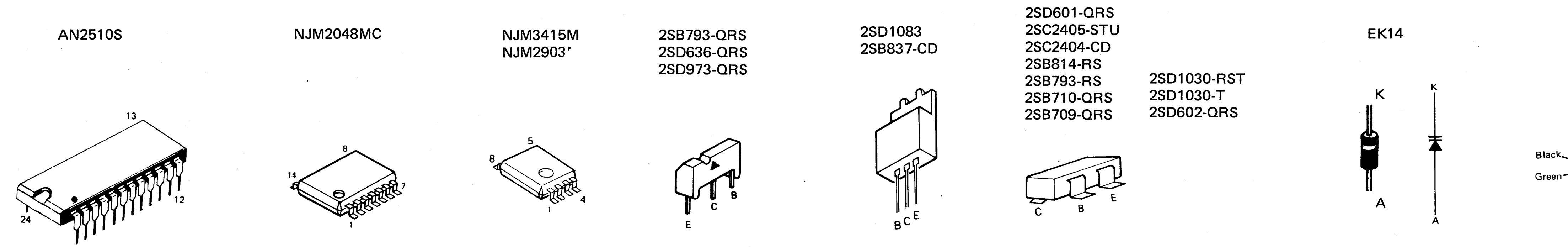
L101
DEFLECTION COIL
for PICK–UP TUBE


HORIZONTAL
VERTICAL
H. D
H. D
V. D
V. D

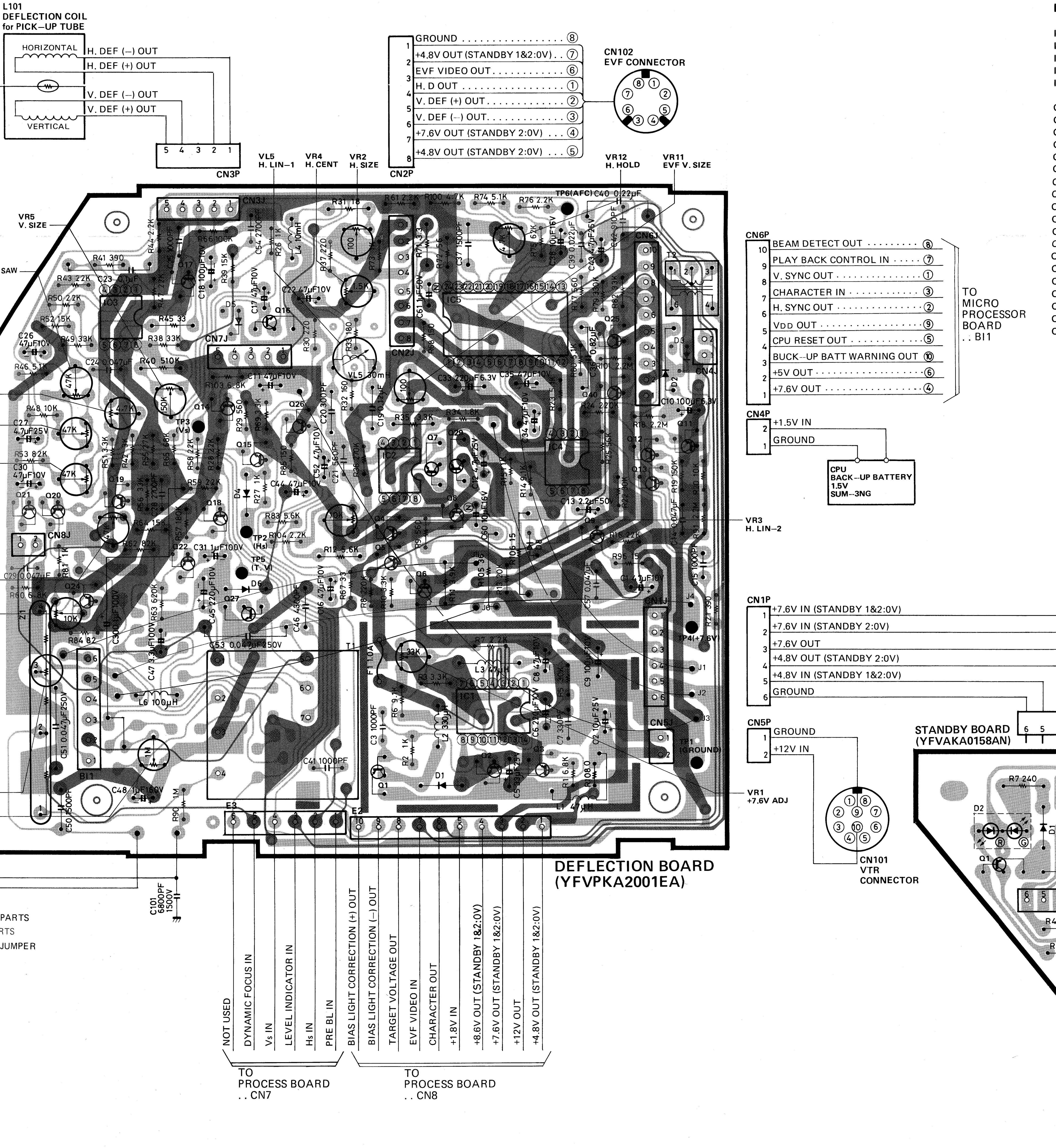

TO
AUDIO/LENS
CONTROL
BOARD
..BI2
+7.6V OUT (STANDBY 1&2:0V) ③
Vs OUT ①
+7.6V OUT (P.B:0V) ④
GROUND ②
BEAM DETECT OUT ⑤
5 4 3 2 1
CN7J
VR5
V. SIZE
VR9
BsV. SAW
R41
R43 22K
R50 2.2K
R52 15K
C26
47µF10V
R49 33K
R46 51
C24
47K
VR6
V. CENT
R48 10K
VR8
Bs V PARA
C27
4.7µF25V
47K
R51 3.3K
R53 82K
VR7
Y. PED
C30
47µF10V
47K
Q21
Q20
BIAS LIGHT
ASSEMBLY
BIAS LIGHT
DC OUT
C102
47µF
10V
1 2
CN8P
CN8J
R81 1K
C29 0.047µF
R60 6.8K
Q24
VR10
TARGET
VR13
BIAS LIGHT
Z1
10K
R84 82
BI1
GROUND
H: +7.6V OUT (STANDBY 2:0V)
K OUT
G1 OUT
G2 OUT
G4 OUT
6
5
4
3
2
1
C51 0.047µF250V
VR15
FOCUS
VR14
BEAM
C50 1500PF
CN103
PICK–UP TUBE
CONNECTOR
①②③④⑤⑥⑦⑧
C
B
A
1
2

COMPONENT SIDE PARTS
PATTERN SIDE PARTS
COMPONENT SIDE JUMPER

UCTOR VIEW OF DEFLECTION BOARD (YFVPKA2001EA)

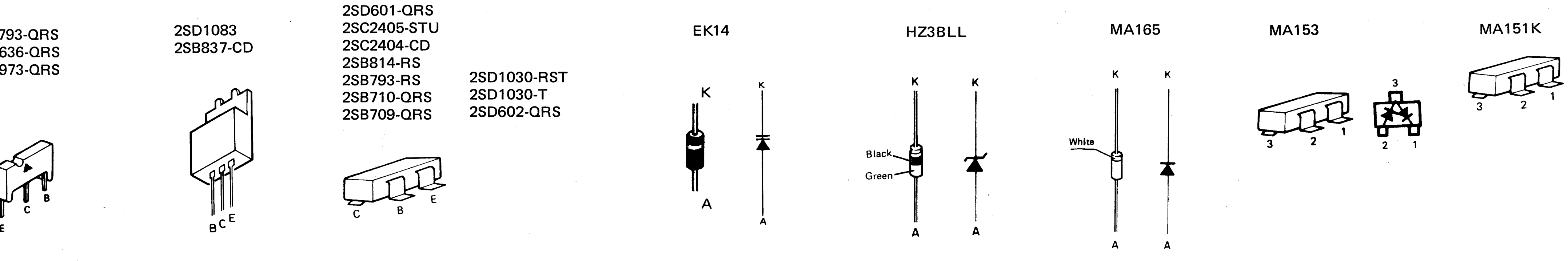


AN2510S
NJM2048MC
NJM3415M
NJM2903'
2SB793-QRS
2SD636-QRS
2SD973-QRS
2SD1083
2SB837-CD
2SD601-QRS
2SC2405-STU
2SC2404-CD
2SB814-RS
2SB793-RS
2SB710-QRS
2SB709-QRS
2SD1030-RST
2SD1030-T
2SD602-QRS
EK14
E C B
B C E
C B E
K
A
Black
Green



L101
DEFLECTION COIL
for PICK-UP TUBE
HORIZONTAL
VERTICAL
H. DEF (–) OUT
H. DEF (+) OUT
V. DEF (–) OUT
V. DEF (+) OUT
CN3P
CN2P
GROUND .... ⑧
+4.8V OUT (STANDBY 1&2:0V) .. ⑦
EVF VIDEO OUT .... ⑥
H. D OUT .... ①
V. DEF (+) OUT .... ②
V. DEF (–) OUT .... ③
+7.6V OUT (STANDBY 2:0V) ... ④
+4.8V OUT (STANDBY 2:0V) ... ⑤
CN102
EVF CONNECTOR
VL5
H. LIN–1
VR4
H. CENT
VR2
H. SIZE
VR12
H. HOLD
VR11
EVF V. SIZE
VR5
V. SIZE
SAW
TP6(AFC)
TP2 (Hs)
TP3 (Vs)
TP5 (T. V)
TP4(+7.6V)
TP1 (GROUND)
CN6P
BEAM DETECT OUT .... ⑧
PLAY BACK CONTROL IN ..... ⑦
V. SYNC OUT .... ①
CHARACTER IN .... ③
H. SYNC OUT .... ②
VDD OUT .... ⑨
CPU RESET OUT .... ⑤
BUCK–UP BATT WARNING OUT ⑩
+5V OUT .... ⑥
+7.6V OUT .... ④
TO
MICRO
PROCESSOR
BOARD
.. BI1
CN4P
+1.5V IN
GROUND
CPU
BACK–UP BATTERY
1.5V
SUM–3NG
VR3
H. LIN–2
CN1P
+7.6V IN (STANDBY 1&2:0V)
+7.6V IN (STANDBY 2:0V)
+7.6V OUT
+4.8V OUT (STANDBY 2:0V)
+4.8V IN (STANDBY 1&2:0V)
GROUND
CN5P
GROUND
+12V IN
STANDBY BOARD
(YFVAKA0158AN)
VR1
+7.6V ADJ
CN101
VTR
CONNECTOR
DEFLECTION BOARD
(YFVPKA2001EA)
C101
6800PF
1500V
PARTS
RTS
JUMPER
NOT USED
DYNAMIC FOCUS IN
Vs IN
LEVEL INDICATOR IN
Hs IN
PRE BL IN
BIAS LIGHT CORRECTION (+) OUT
BIAS LIGHT CORRECTION (–) OUT
TARGET VOLTAGE OUT
EVF VIDEO IN
CHARACTER OUT
+1.8V IN
+8.6V OUT (STANDBY 1&2:0V)
+7.6V OUT (STANDBY 1&2:0V)
+12V OUT
+4.8V OUT (STANDBY 1&2:0V)
TO
PROCESS BOARD
.. CN7
TO
PROCESS BOARD
.. CN8
CN3J
CN7J
CN2J
CN6J
CN4J
CN8J
CN1J
CN5J
BI1
E3
E2
T1
T2
IC1
IC2
IC3
IC4
IC5
F1 1.0A
L3 47μH
L6 100μH
L2 330μH
L4 10mH
L1 47μH
VL5 30mH
2
3
4
5

YFVPKA2001EA)



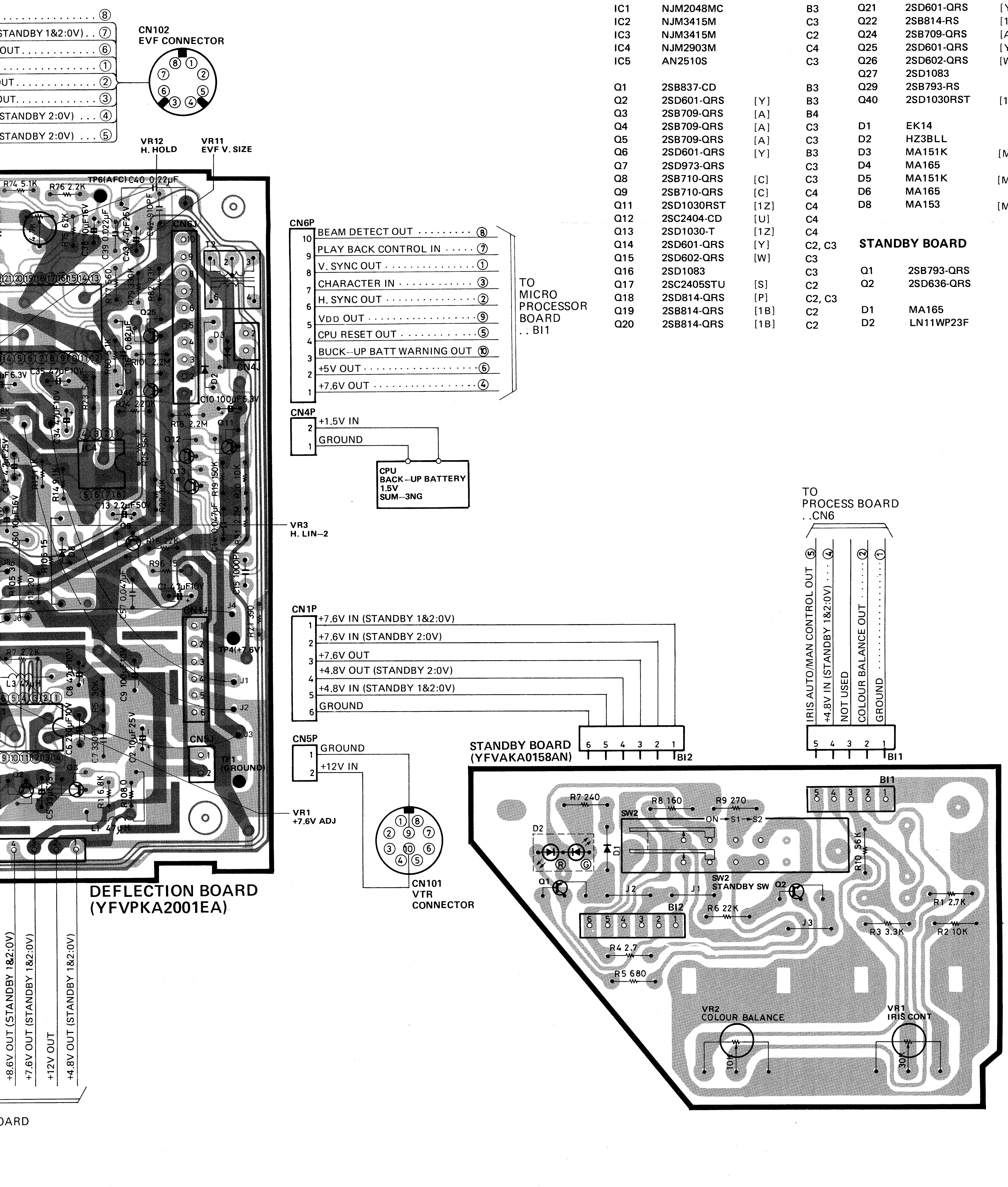
793-QRS
636-QRS
973-QRS
E
C
B
2SD1083
2SB837-CD
B C E
2SD601-QRS
2SC2405-STU
2SC2404-CD
2SB814-RS
2SB793-RS
2SB710-QRS
2SB709-QRS
C
B
E
2SD1030-RST
2SD1030-T
2SD602-QRS
EK14
K
A
HZ3BLL
Black
Green
MA165
White
MA153
3
2
1
MA151K
1 : N
2 : A
3 : C

DEFLECTION BOARD

IC1	NJM2048MC		B3	Q21	2SD601-QRS	[Y]	C2
IC2	NJM3415M		C3	Q22	2SB814-RS	[1B]	C2
IC3	NJM3415M		C2	Q24	2SB709-QRS	[A]	B2
IC4	NJM2903M		C4	Q25	2SD601-QRS	[Y]	C4
IC5	AN2510S		C3	Q26	2SD602-QRS	[W]	C3
				Q27	2SD1083		B3
Q1	2SB837-CD		B3	Q29	2SB793-RS		C3
Q2	2SD601-QRS	[Y]	B3	Q40	2SD1030RST	[1Z]	C4
Q3	2SB709-QRS	[A]	B4				
Q4	2SB709-QRS	[A]	C3	D1	EK14		B3
Q5	2SB709-QRS	[A]	C3	D2	HZ3BLL		C4
Q6	2SD601-QRS	[Y]	B3	D3	MA151K	[MH]	C4
Q7	2SD973-QRS		C3	D4	MA165		C3
Q8	2SB710-QRS	[C]	C3	D5	MA151K	[MH]	C3
Q9	2SB710-QRS	[C]	C4	D6	MA165		B3
Q11	2SD1030RST	[1Z]	C4	D8	MA153	[MC]	C4
Q12	2SC2404-CD	[U]	C4				
Q13	2SD1030-T	[1Z]	C4				
Q14	2SD601-QRS	[Y]	C2, C3				
Q15	2SD602-QRS	[W]	C3				
Q16	2SD1083		C3				
Q17	2SC2405STU	[S]	C2				
Q18	2SD814-QRS	[P]	C2, C3				
Q19	2SB814-QRS	[1B]	C2				
Q20	2SB814-QRS	[1B]	C2				

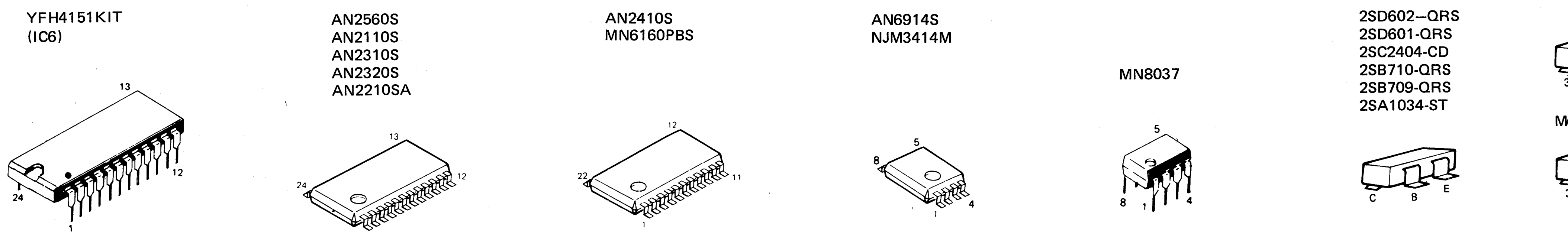
STANDBY BOARD

Q1	2SB793-QRS	A5
Q2	2SD636-QRS	A6
D1	MA165	B5
D2	LN11WP23F	B5

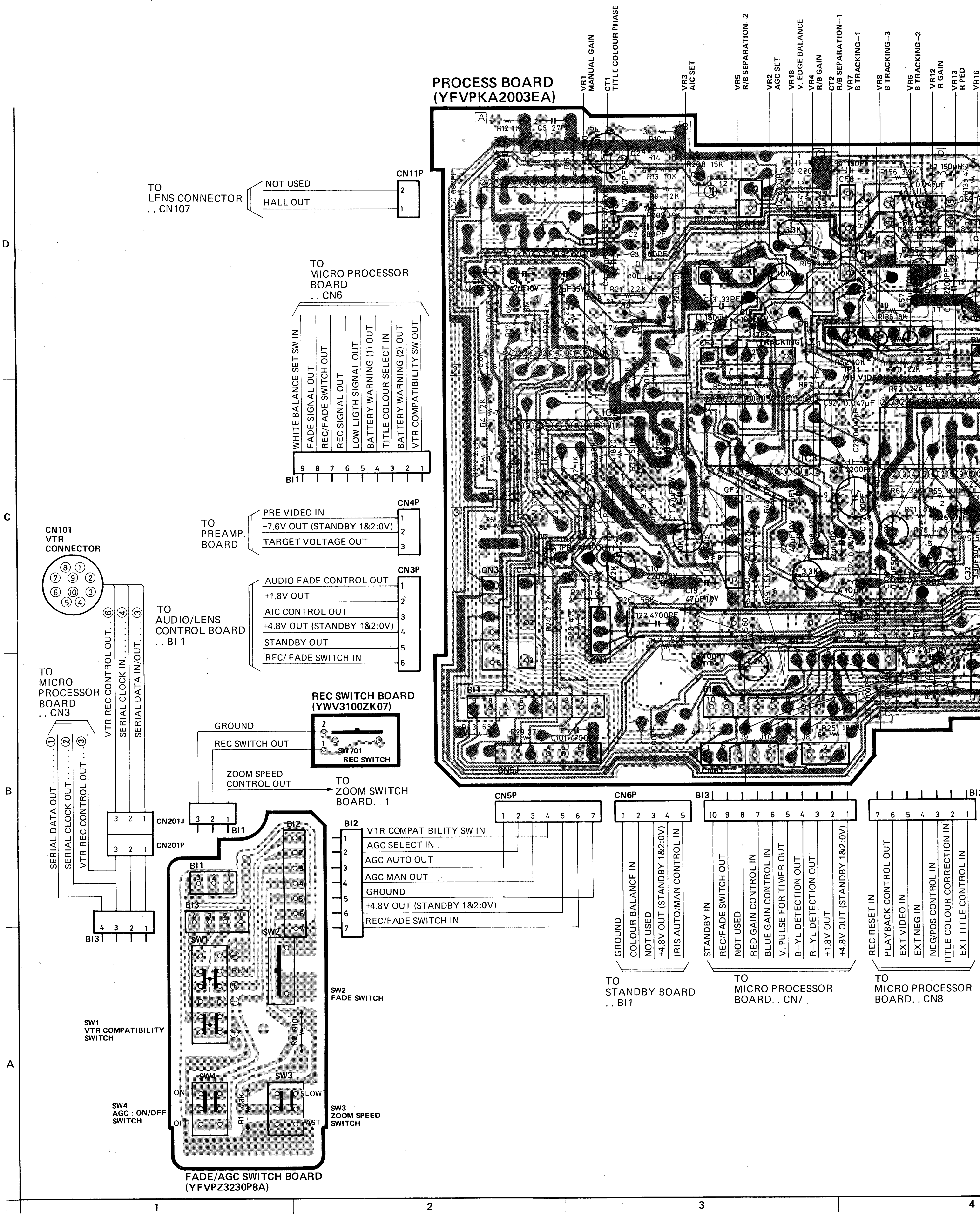


CN102
EVF CONNECTOR
STANDBY 1&2:0V) . . ⑦
OUT . . . . ⑥
. . . . ⑧
. . . . ①
UT . . . . ②
UT . . . . ③
STANDBY 2:0V) . . . ④
STANDBY 2:0V) . . . ⑤
VR12
H. HOLD
VR11
EVF V. SIZE
TP6(AFC)
CN6P
BEAM DETECT OUT . . . . ⑧
PLAY BACK CONTROL IN . . . . . ⑦
V. SYNC OUT . . . . ①
CHARACTER IN . . . . ③
H. SYNC OUT . . . . ②
VDD OUT . . . . ⑨
CPU RESET OUT . . . . ⑤
BUCK--UP BATT WARNING OUT ⑩
+5V OUT . . . . ⑥
+7.6V OUT . . . . ④
TO
MICRO
PROCESSOR
BOARD
. . BI1
CN4P
+1.5V IN
GROUND
CPU
BACK--UP BATTERY
1.5V
SUM--3NG
VR3
H. LIN--2
CN1P
+7.6V IN (STANDBY 1&2:0V)
+7.6V IN (STANDBY 2:0V)
+7.6V OUT
+4.8V OUT (STANDBY 2:0V)
+4.8V IN (STANDBY 1&2:0V)
GROUND
CN5P
GROUND
+12V IN
VR1
+7.6V ADJ
CN101
VTR
CONNECTOR
DEFLECTION BOARD
(YFVPKA2001EA)
+8.6V OUT (STANDBY 1&2:0V)
+7.6V OUT (STANDBY 1&2:0V)
+12V OUT
+4.8V OUT (STANDBY 1&2:0V)
DARD
TO
PROCESS BOARD
. . CN6
IRIS AUTO/MAN CONTROL OUT ⑤
+4.8V IN (STANDBY 1&2:0V) . . . ④
NOT USED
COLOUR BALANCE OUT . . . . . . ②
GROUND . . . . ①
STANDBY BOARD
(YFVAKA0158AN)
BI2
BI1
R7 240
R8 160
R9 270
SW2
ON
S1
S2
D2
D1
Q1
Q2
J1
J2
J3
SW2
STANDBY SW
R10 56K
R6 22K
R1 2.7K
R3 3.3K
R2 10K
R4 2.7
R5 680
VR2
COLOUR BALANCE
VR1
IRIS CONT
10K
30K
4
5
6

CONDUCTOR V



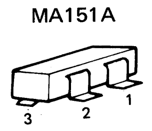
YFH4151KIT
(IC6)
AN2560S
AN2110S
AN2310S
AN2320S
AN2210SA
AN2410S
MN6160PBS
AN6914S
NJM3414M
MN8037
2SD602–QRS
2SD601-QRS
2SC2404-CD
2SB710-QRS
2SB709-QRS
2SA1034-ST
C
B
E
13
12
24
1
22
11
5
8
4



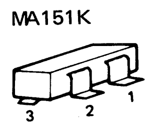
PROCESS BOARD
(YFVPKA2003EA)
VR1 MANUAL GAIN
CT1 TITLE COLOUR PHASE
VR3 AIC SET
VR5 R/B SEPARATION–2
VR2 AGC SET
VR18 V. EDGE BALANCE
VR4 R/B GAIN
CT2 R/B SEPARATION–1
VR7 B TRACKING–1
VR8 B TRACKING–3
VR6 B TRACKING–2
VR12 R GAIN
VR13 R PED
VR16
TO LENS CONNECTOR . . CN107
NOT USED
HALL OUT
CN11P
TO MICRO PROCESSOR BOARD . . CN6
WHITE BALANCE SET SW IN
FADE SIGNAL OUT
REC/FADE SWITCH OUT
REC SIGNAL OUT
LOW LIGTH SIGNAL OUT
BATTERY WARNING (1) OUT
TITLE COLOUR SELECT IN
BATTERY WARNING (2) OUT
VTR COMPATIBILITY SW OUT
BI1
TO PREAMP. BOARD
PRE VIDEO IN
+7,6V OUT (STANDBY 1&2:0V)
TARGET VOLTAGE OUT
CN4P
CN101
VTR CONNECTOR
TO AUDIO/LENS CONTROL BOARD . . BI 1
AUDIO FADE CONTROL OUT
+1,8V OUT
AIC CONTROL OUT
+4.8V OUT (STANDBY 1&2:0V)
STANDBY OUT
REC/ FADE SWITCH IN
CN3P
VTR REC CONTROL OUT. . ⑥
SERIAL CLOCK IN. . . . . . . ④
SERIAL DATA IN/OUT. . . . ③
TO MICRO PROCESSOR BOARD . . CN3
SERIAL DATA OUT . . . . ①
SERIAL CLOCK OUT . . . . . . ②
VTR REC CONTROL OUT . . ③
BI3
CN201J
CN201P
REC SWITCH BOARD
(YWV3100ZK07)
GROUND
REC SWITCH OUT
SW701
REC SWITCH
ZOOM SPEED CONTROL OUT
TO ZOOM SWITCH BOARD. . 1
BI2
VTR COMPATIBILITY SW IN
AGC SELECT IN
AGC AUTO OUT
AGC MAN OUT
GROUND
+4.8V OUT (STANDBY 1&2:0V)
REC/FADE SWITCH IN
CN5P
CN6P
GROUND
COLOUR BALANCE IN
NOT USED
+4.8V OUT (STANDBY 1&2:0V)
IRIS AUTO/MAN CONTROL IN
TO STANDBY BOARD . . BI1
BI3
STANDBY IN
REC/FADE SWITCH OUT
NOT USED
RED GAIN CONTROL IN
BLUE GAIN CONTROL IN
V. PULSE FOR TIMER OUT
B–YL DETECTION OUT
R–YL DETECTION OUT
+1.8V OUT
+4.8V OUT (STANDBY 1&2:0V)
TO MICRO PROCESSOR BOARD. . CN7
REC RESET IN
PLAYBACK CONTROL OUT
EXT VIDEO IN
EXT NEG IN
NEG/POS CONTROL IN
TITLE COLOUR CORRECTION IN
EXT TITLE CONTROL IN
TO MICRO PROCESSOR BOARD. . CN8
SW1
SW2
SW3
SW4
RUN
R1 4.3K
R2 910
ON
OFF
SLOW
FAST
SW2 FADE SWITCH
SW1 VTR COMPATIBILITY SWITCH
SW4 AGC : ON/OFF SWITCH
SW3 ZOOM SPEED SWITCH
FADE/AGC SWITCH BOARD
(YFVPZ3230P8A)
CN3
CN4J
CN5J
CN6J
IC2
IC3
(PREAMP OUT)
(TRACKING)
(Y VIDEO)
A
B
C
D
1
2
3
4

CTOR VIEW OF PROCESS BOARD (YFVPKA2003EA)

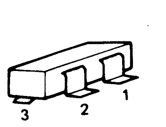
QRS
QRS
CD
QRS
QRS
-ST


MA151A

1 : NC
2 : Cathode
3 : Anode

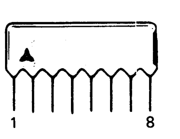

MA151K

1 : NC
2 : Anode
3 : Cathode


MA151WA

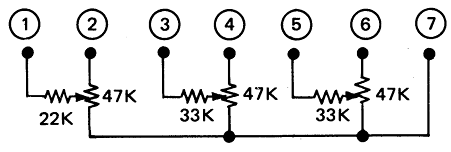
1 : Cathode
2 : Cathode
3 : Anode

Z4 EXBF6L323J
Z3 EXBF5L324J
Z2 EXBD85322S
Z1 EXBD87321JW
IC13 MT0001
IC12 EHMB09H85



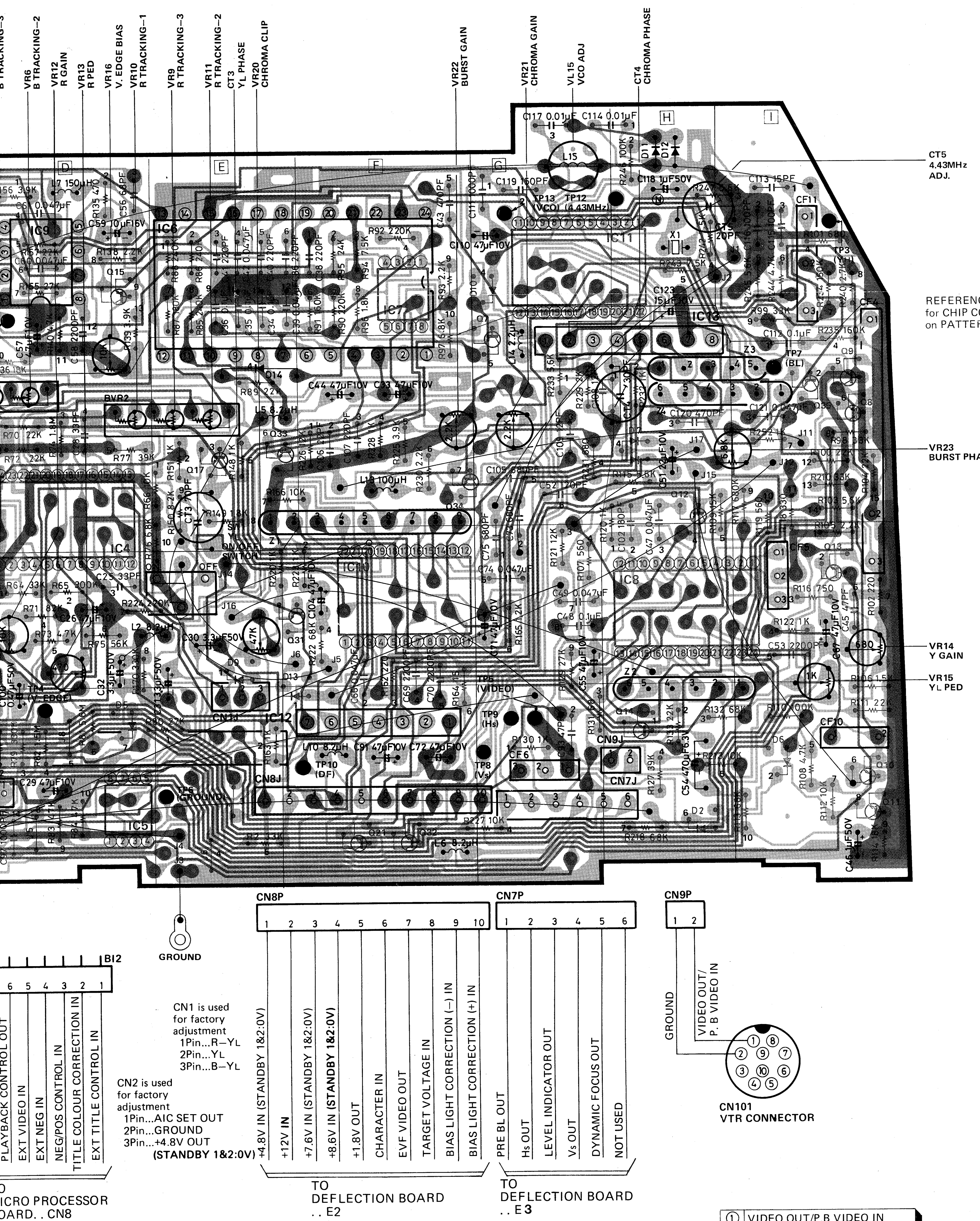
BVR1
BVR2
1622A001

BLOCK VARIABLE RESISTOR


①
②
③
④
⑤
⑥
⑦
22K
47K
33K
47K
33K
47K

PROCESS BOARD

IC1	AN2560S		D2	Q6
IC2	AN2110S		C3	Q7
IC3	AN2310S		C3	Q8
IC4	AN2320S		C4	Q9
IC5	AN6914S		B4	Q1
IC6	YFH4151KIT		D5, D4	Q1
IC7	NJM3414M		D5	Q1
IC8	AN2210SA		D4, D5	Q1
IC9	MN8037		D4	Q1
IC10	AN2410S		C5	Q1
IC11	MN6160PBS		D5, D6	Q1
IC12	EHMB09H85		C5	Q1
IC13	MT0001		D6	Q2
				Q3
Q1	2SB709-QRS	[A]	C2	Q3
Q2	2SC2404-CD	[U]	D3	Q3
Q3	2SD601-QRS	[Y]	D2	Q3
Q4	2SD601-QRS	[Y]	C3	Q3
Q5	2SD601-QRS	[Y]	C2	Q3


VR6 B TRACKING-2
VR12 R GAIN
VR13 R PED
VR16 V. EDGE BIAS
VR10 R TRACKING-1
VR9 R TRACKING-3
VR11 R TRACKING-2
CT3 YL PHASE
VR20 CHROMA CLIP
VR22 BURST GAIN
VR21 CHROMA GAIN
VL15 VCO ADJ
CT4 CHROMA PHASE
CT5 4.43MHz ADJ.
REFERENCE NUMBER for CHIP COMPONENT on PATTERN SIDE
VR23 BURST PHASE
VR14 Y GAIN
VR15 YL PED
D
E
F
G
H
I
IC4
IC5
IC6
IC7
IC8
IC9
IC11
IC12
IC13
BVR2
TP4 (V. EDGE)
TP6 (VIDEO)
TP7 (BL)
TP8 (Vs)
TP9 (Hs)
TP10 (DF)
TP12
TP13 (VCO) (4.43MHz)
CN8J
CN7J
CN9J
CN1
GROUND
BI2
6 5 4 3 2 1
PLAYBACK CONTROL OUT
EXT VIDEO IN
EXT NEG IN
NEG/POS CONTROL IN
TITLE COLOUR CORRECTION IN
EXT TITLE CONTROL IN
O
ICRO PROCESSOR
OARD. . CN8
CN1 is used for factory adjustment
1Pin...R–YL
2Pin...YL
3Pin...B–YL
CN2 is used for factory adjustment
1Pin...AIC SET OUT
2Pin...GROUND
3Pin...+4.8V OUT
(STANDBY 1&2:0V)
CN8P
1 2 3 4 5 6 7 8 9 10
+4.8V IN (STANDBY 1&2:0V)
+12V IN
+7.6V IN (STANDBY 1&2:0V)
+8.6V IN (STANDBY 1&2:0V)
+1.8V OUT
CHARACTER IN
EVF VIDEO OUT
TARGET VOLTAGE IN
BIAS LIGHT CORRECTION (–) IN
BIAS LIGHT CORRECTION (+) IN
TO DEFLECTION BOARD . . E2
CN7P
1 2 3 4 5 6
PRE BL OUT
Hs OUT
LEVEL INDICATOR OUT
Vs OUT
DYNAMIC FOCUS OUT
NOT USED
TO DEFLECTION BOARD . . E3
CN9P
1 2
GROUND
VIDEO OUT/ P. B VIDEO IN
CN101 VTR CONNECTOR

①	VIDEO OUT/P.B VIDEO IN
②	GROUND FOR PIN ①
③	SERIAL DATA IN/OUT
④	SERIAL CLOCK IN
⑤	AUDIO CH2(R)/STANDBY OUT
⑥	VTR REC CONTROL OUT
⑦	AUDIO CH1(L) OUT
⑧	AUDIO GROUND
⑨	GROUND
⑩	+12V IN

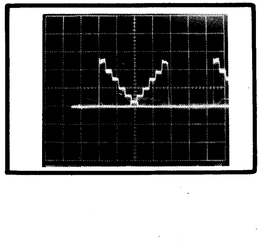
●–w–● COMPONENT SIDE PARTS

●–w–● PATTERN SIDE PARTS

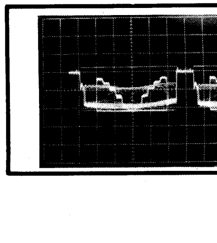
●——● COMPONENT SIDE JUMPER

○——○ PATTERN SIDE JUMPER

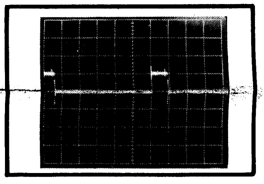
18 0.2V/DIV, 10µs/DIV



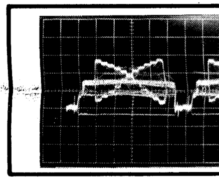
19 0.2V/DIV, 10µs/D



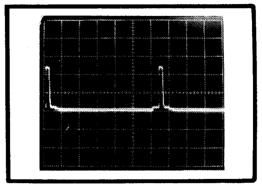
23 0.1V/DIV, 10µs/DIV



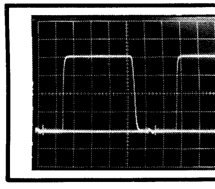
24 50mV/DIV, 10µs/



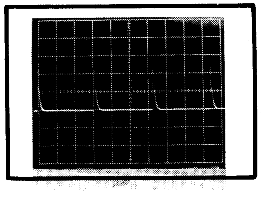
28 2V/DIV, 10µs/DIV



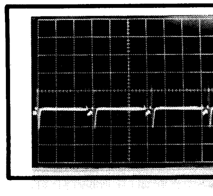
29 0.2V/DIV, 10µs/D



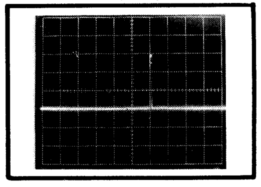
33 1V/DIV, 20µs/DIV



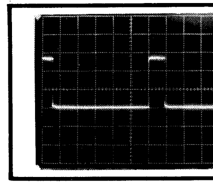
34 0.02V/DIV, 20µs/



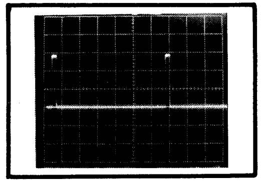
38 2V/DIV, 10µs/DIV



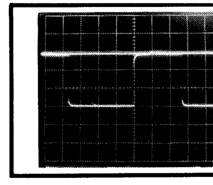
39 2V/DIV, 10µs/DI



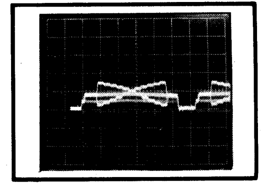
43 2V/DIV, 10µs/DIV



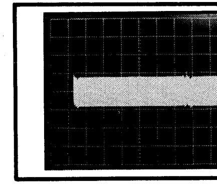
44 2V/DIV, 10µs/DI



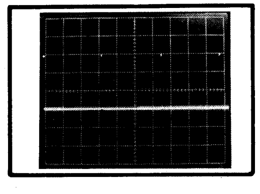
48 0.1V/DIV, 10µs/DIV



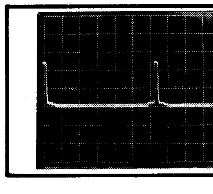
49 0.5V/DIV, 10µs/D



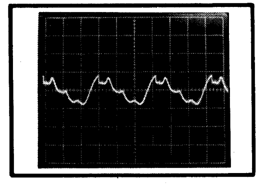
53 2V/DIV, 5ms/DIV



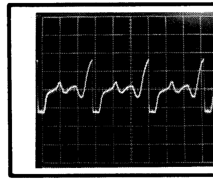
54 2V/DIV, 10µs/DI



58 0.5V/DIV, 20µs/DIV

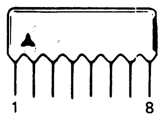


59 0.5V/DIV, 20µs/D



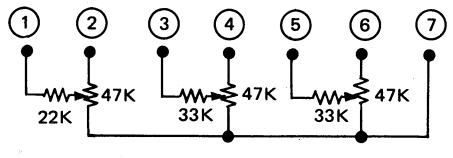
(YFVPKA2003EA)

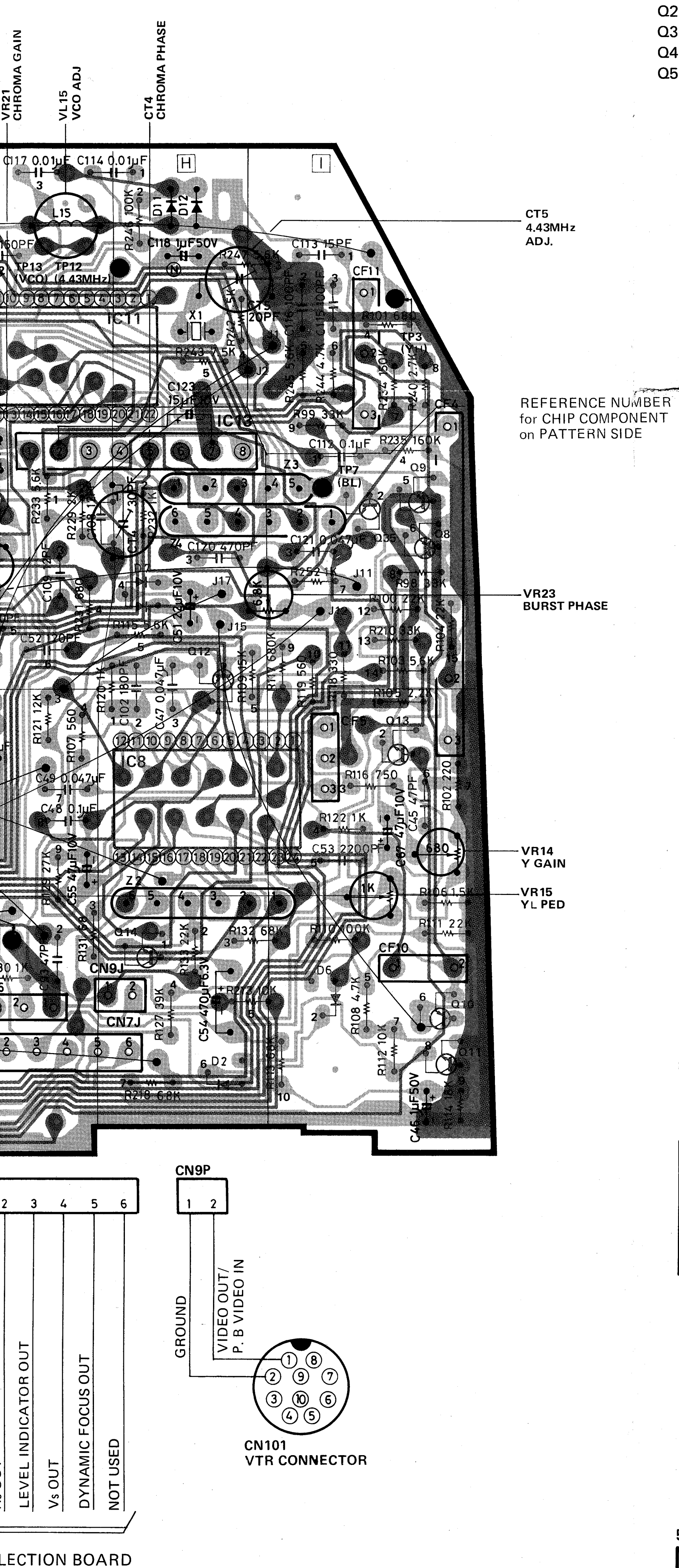
Z4	EXBF6L323J
Z3	EXBF5L324J
Z2	EXBD85322S
Z1	EXBD87321JW
IC13	MT0001
IC12	EHMB09H85



BVR1
BVR2
1622A001

BLOCK VARIABLE RESISTOR


①
②
③
④
⑤
⑥
⑦
22K
47K
33K
47K
33K
47K


VR21 CHROMA GAIN
VL15 VCO ADJ
CT4 CHROMA PHASE
CT5 4.43MHz ADJ.
REFERENCE NUMBER for CHIP COMPONENT on PATTERN SIDE
VR23 BURST PHASE
VR14 Y GAIN
VR15 YL PED
H
I
IC11
IC12
IC8
CN9P
GROUND
VIDEO OUT/ P. B VIDEO IN
CN101 VTR CONNECTOR
LEVEL INDICATOR OUT
Vs OUT
DYNAMIC FOCUS OUT
NOT USED
LECTION BOARD

①	VIDEO OUT/P.B VIDEO IN
②	GROUND FOR PIN ①
③	SERIAL DATA IN/OUT
④	SERIAL CLOCK IN
⑤	AUDIO CH2(R)/STANDBY OUT
⑥	VTR REC CONTROL OUT
⑦	AUDIO CH1(L) OUT
⑧	AUDIO GROUND
⑨	GROUND
⑩	+12V IN

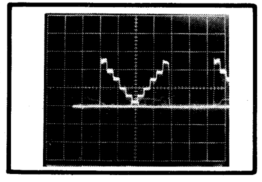
6

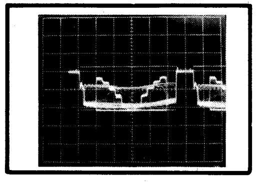
PROCESS BOARD

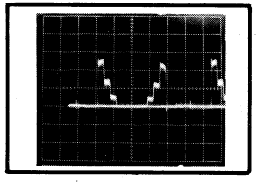
IC1	AN2560S		D2
IC2	AN2110S		C3
IC3	AN2310S		C3
IC4	AN2320S		C4
IC5	AN6914S		B4
IC6	YFH4151KIT		D5, D4
IC7	NJM3414M		D5
IC8	AN2210SA		D4, D5
IC9	MN8037		D4
IC10	AN2410S		C5
IC11	MN6160PBS		D5, D6
IC12	EHMB09H85		C5
IC13	MT0001		D6
Q1	2SB709-QRS	[A]	C2
Q2	2SC2404-CD	[U]	D3
Q3	2SD601-QRS	[Y]	D2
Q4	2SD601-QRS	[Y]	C3
Q5	2SD601-QRS	[Y]	C2

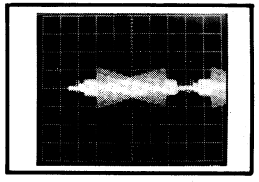
Q6	2SD601-QRS	[Y]	C4
Q7	2SD602-QRS	[W]	D5
Q8	2SB709-QRS	[A]	D6
Q9	2SB709-QRS	[A]	D6
Q10	2SB709-QRS	[A]	B6
Q11	2SD601-QRS	[Y]	B6
Q12	2SB709-QRS	[A]	C6
Q13	2SD601-QRS	[Y]	C6
Q14	2SD601-QRS	[Y]	C6
Q15	2SB709-QRS	[A]	D4
Q17	2SD601-QRS	[Y]	C4
Q18	2SD601-QRS	[Y]	D4
Q21	2SD601-QRS	[Y]	B5
Q30	2SB709-QRS	[A]	D3
Q31	2SC2404-CD	[V]	C5
Q32	2SD601-QRS	[Y]	B5
Q33	2SC2404-CD	[V]	D4, D5
Q34	2SC2404-CD	[V]	C5
Q35	2SC2404-CD	[V]	D6

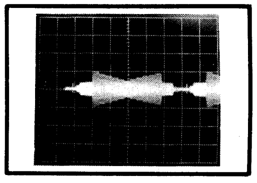
D1	MA151K	[MH]	D3
D2	MA151K	[MH]	B6
D3	MA151K	[MH]	D3
D4	MA151A	[MA]	D3
D5	MA151K	[MH]	C4
D6	MA151K	[MH]	C6
D7	MA151WA	[MN]	C5
D9	MA151K	[MH]	C4
D10	MA151K	[MH]	D5
D11	YUD1S2688		D6
D12	YUD1S2688		D6
D13	MA151K	[MH]	C5
D14	MA165		D4

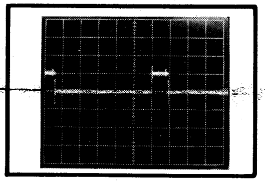

18 0.2V/DIV, 10μs/DIV

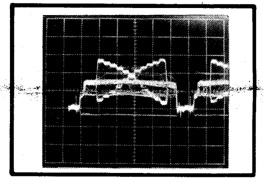

19 0.2V/DIV, 10μs/DIV

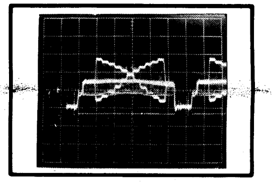

20 0.1V/DIV, 10μs/DIV

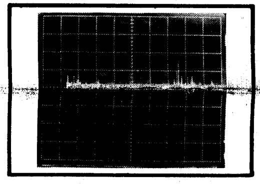

21 50mV/DIV, 10μs/DIV

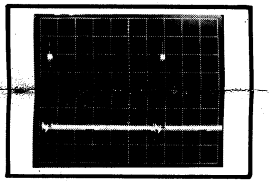

22 0.1V/DIV, 10μs/DIV

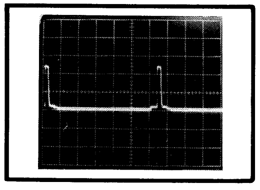

23 0.1V/DIV, 10μs/DIV

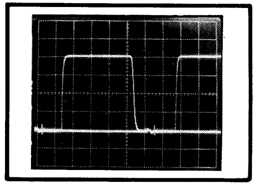

24 50mV/DIV, 10μs/DIV

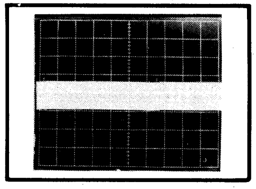

25 50mV/DIV, 10μs/DIV

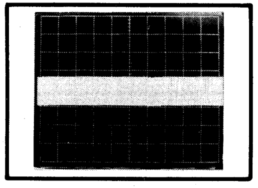

26 0.1V/DIV, 10μs/DIV

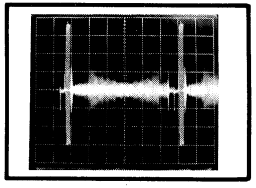

27 0.1V/DIV, 10μs/DIV

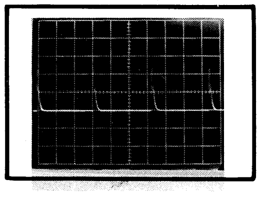

28 2V/DIV, 10μs/DIV

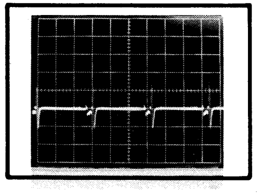

29 0.2V/DIV, 10μs/DIV

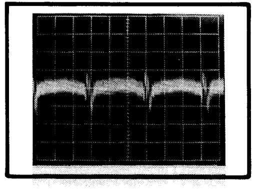

30 0.2V/DIV, 10μs/DIV

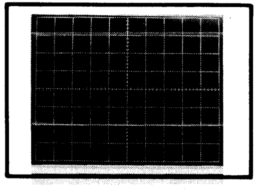

31 0.2V/DIV, 10μs/DIV

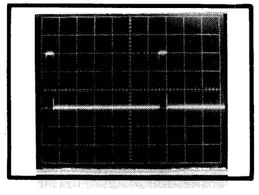

32 0.2V/DIV, 10μs/DIV

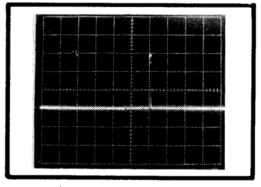

33 1V/DIV, 20μs/DIV

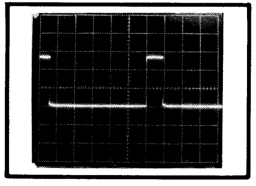

34 0.02V/DIV, 20μs/DIV

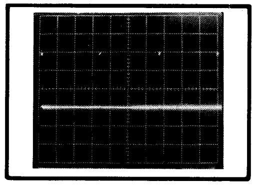

35 5mV/DIV, 20μs/DIV

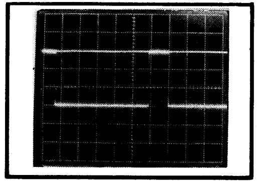

36 0.2V/DIV, 10μs/DIV

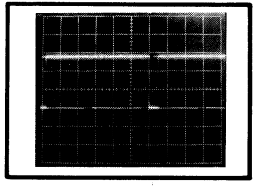

37 2V/DIV, 10μs/DIV

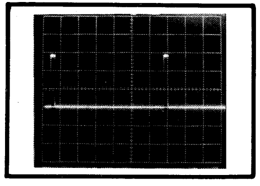

38 2V/DIV, 10μs/DIV

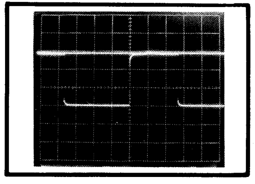

39 2V/DIV, 10μs/DIV

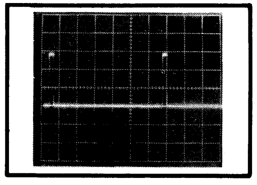

40 2V/DIV, 5ms/DIV

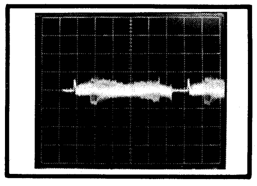

41 2V/DIV, 10μs/DIV

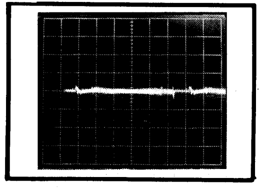

42 2V/DIV, 10μs/DIV

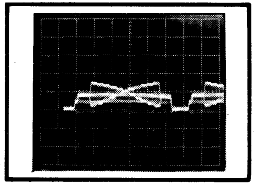

43 2V/DIV, 10μs/DIV

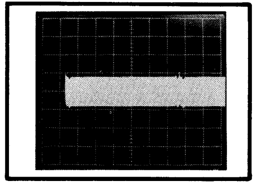

44 2V/DIV, 10μs/DIV

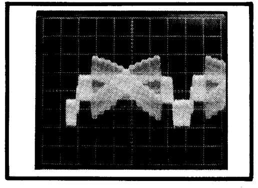

45 2V/DIV, 10μs/DIV

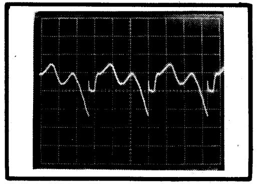

46 0.2V/DIV, 10μs/DIV

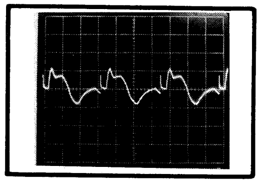

47 0.2V/DIV, 10μs/DIV

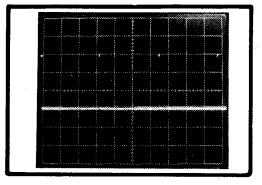

48 0.1V/DIV, 10μs/DIV

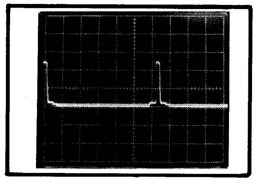

49 0.5V/DIV, 10μs/DIV

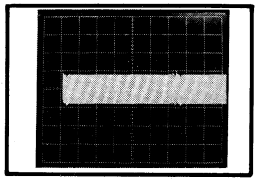

50 0.2V/DIV, 10μs/DIV

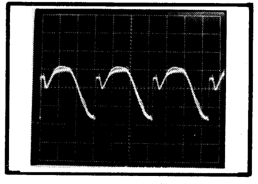

51 0.2V/DIV, 5ms/DIV

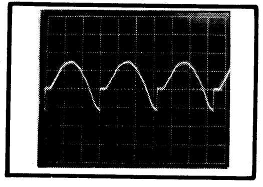

52 0.2V/DIV, 5ms/DIV

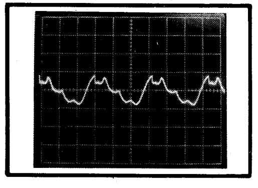

53 2V/DIV, 5ms/DIV

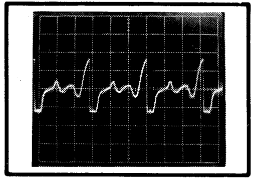

54 2V/DIV, 10μs/DIV

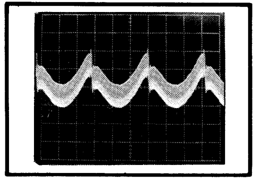

55 0.5V/DIV, 10μs/DIV


56 0.2V/DIV, 20μs/DIV


57 1V/DIV, 20μs/DIV

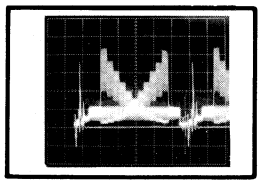

58 0.5V/DIV, 20μs/DIV


59 0.5V/DIV, 20μs/DIV

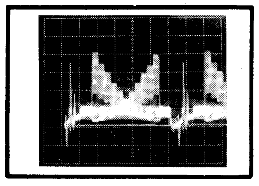

60 2V/DIV, 20μs/DIV

SCHEMATIC D

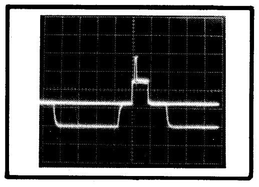
1 0.2V/DIV, 10µs/DIV



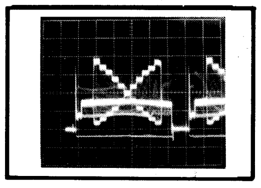
2 0.2V/DIV, 10µs/DIV



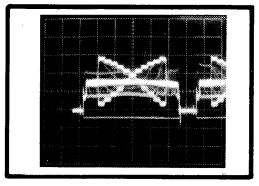
3 1V/DIV, 10µs/DIV



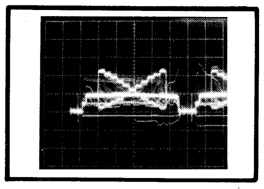
4 0.1V/DIV, 10µs/DIV



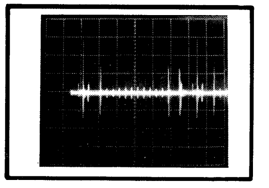
5 0.1V/DIV, 10µs/DIV

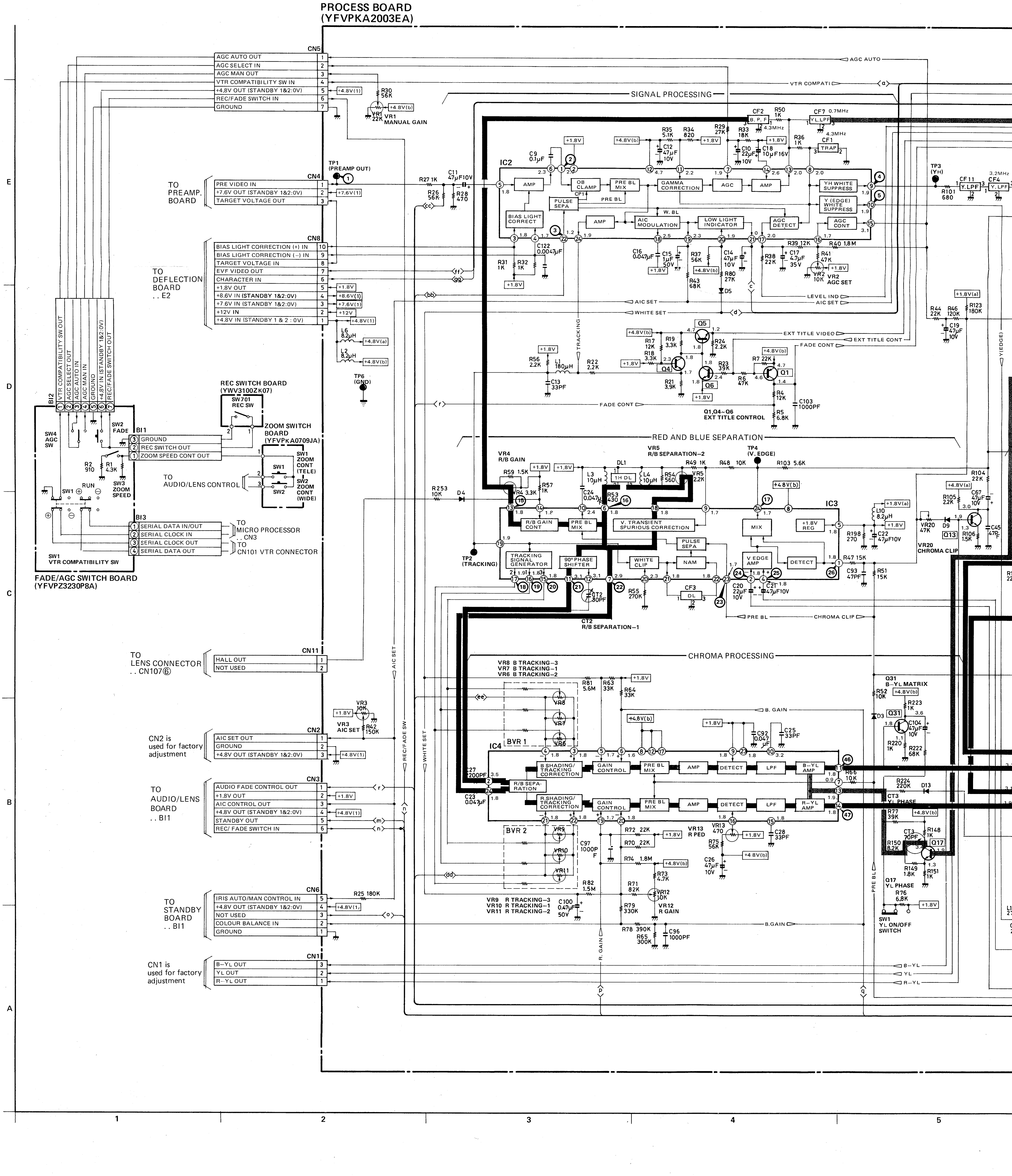


6 50mV/DIV, 10µs/DIV

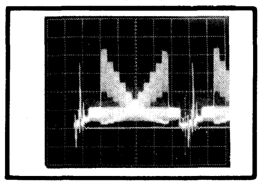


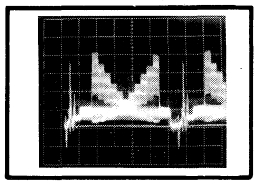
7 0.1V/DIV, 10µs/DIV





SCHEMATIC D


1 0.2V/DIV, 10μs/DIV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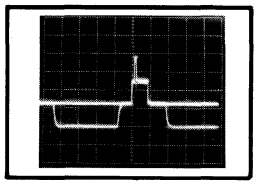
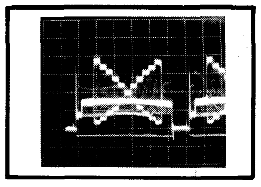

3 1V/DIV, 10μs/DIV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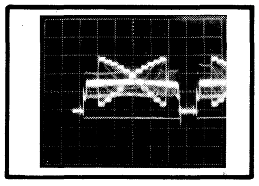
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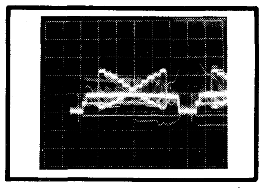
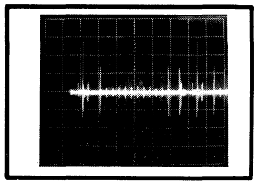
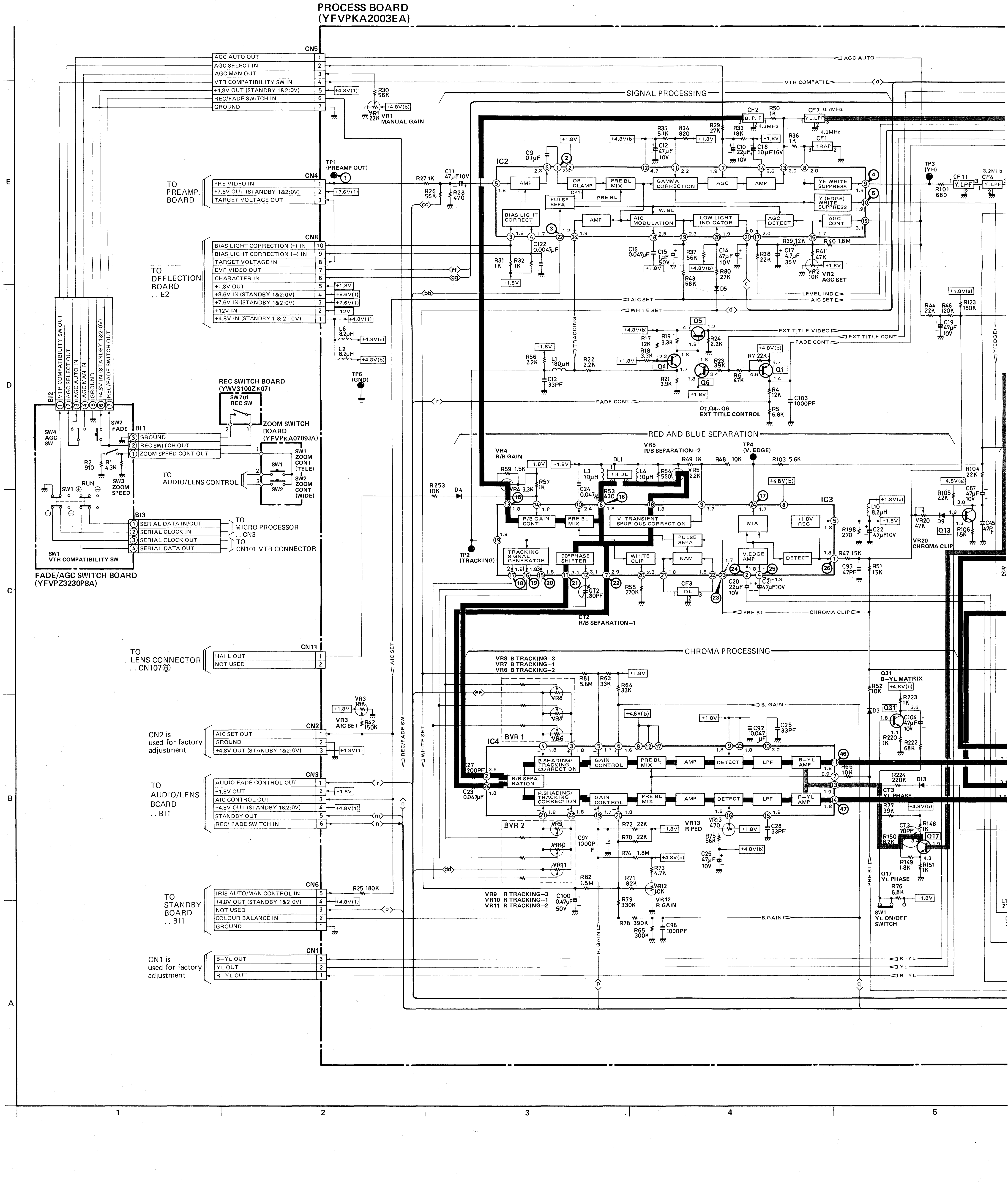
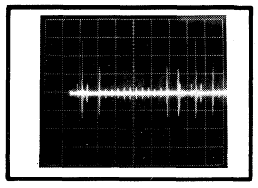

6 50mV/DIV, 10μs/DIV


7 0.1V/DIV, 10μs/DIV


PROCESS BOARD
(YFVPKA2003EA)
CN5
AGC AUTO OUT
AGC SELECT IN
AGC MAN OUT
VTR COMPATIBILITY SW IN
+4.8V OUT (STANDBY 1&2:0V)
REC/FADE SWITCH IN
GROUND
R30 56K
VR1 22K MANUAL GAIN
TP1 (PREAMP OUT)
CN4
TO PREAMP. BOARD
PRE VIDEO IN
+7.6V OUT (STANDBY 1&2:0V)
TARGET VOLTAGE OUT
CN8
TO DEFLECTION BOARD .. E2
BIAS LIGHT CORRECTION (+) IN
BIAS LIGHT CORRECTION (–) IN
TARGET VOLTAGE IN
EVF VIDEO OUT
CHARACTER IN
+1.8V OUT
+8.6V IN (STANDBY 1&2:0V)
+7.6V IN (STANDBY 1&2:0V)
+12V IN
+4.8V IN (STANDBY 1 & 2 : 0V)
L6 8.2μH
L2 8.2μH
TP6 (GND)
BI2
VTR COMPATIBILITY SW OUT
AGC SELECT OUT
AGC AUTO IN
AGC MAN IN
GROUND
+4.8V IN (STANDBY 1&2:0V)
REC/FADE SWITCH OUT
SW4 AGC SW
SW2 FADE
BI1
GROUND
REC SWITCH OUT
ZOOM SPEED CONT OUT
R2 910
R1 4.3K
SW3 ZOOM SPEED
RUN
SW1
BI3
SERIAL DATA IN/OUT
SERIAL CLOCK IN
SERIAL CLOCK OUT
SERIAL DATA OUT
SW1 VTR COMPATIBILITY SW
FADE/AGC SWITCH BOARD
(YFVPZ3230P8A)
REC SWITCH BOARD
(YWV3100ZK07)
SW701 REC SW
ZOOM SWITCH BOARD
(YFVPKA0709JA)
SW1 ZOOM CONT (TELE)
SW2 ZOOM CONT (WIDE)
TO AUDIO/LENS CONTROL
TO MICRO PROCESSOR .. CN3
TO CN101 VTR CONNECTOR
CN11
TO LENS CONNECTOR .. CN107⑥
HALL OUT
NOT USED
CN2
CN2 is used for factory adjustment
AIC SET OUT
GROUND
+4.8V OUT (STANDBY 1&2:0V)
VR3 10K AIC SET
R42 150K
CN3
TO AUDIO/LENS BOARD .. BI1
AUDIO FADE CONTROL OUT
+1.8V OUT
AIC CONTROL OUT
+4.8V OUT (STANDBY 1&2:0V)
STANDBY OUT
REC/ FADE SWITCH IN
CN6
TO STANDBY BOARD .. BI1
IRIS AUTO/MAN CONTROL IN
+4.8V OUT (STANDBY 1&2:0V)
NOT USED
COLOUR BALANCE IN
GROUND
R25 180K
CN1
CN1 is used for factory adjustment
B–YL OUT
YL OUT
R–YL OUT
SIGNAL PROCESSING
IC2
AMP
OB CLAMP
PRE BL MIX
GAMMA CORRECTION
AGC
AMP
YH WHITE SUPPRESS
Y (EDGE) WHITE SUPPRESS
PULSE SEPA
BIAS LIGHT CORRECT
AIC MODULATION
LOW LIGHT INDICATOR
AGC DETECT
AGC CONT
W. BL
PRE BL
CF2 B. P. F
CF7 Y.L.LPF
CF1 TRAP
4.3MHz
0.7MHz
R50 1K
R36 1K
R35 5.1K
R34 820
R29 27K
R33 18K
C12 47μF 10V
C10 22μF 10V
C18 10μF16V
C9 0.1μF
C11 47μF10V
R27 1K
R26 56K
R28 470
C122 0.0047μF
R31 1K
R32 1K
C16 0.047μF
C15 1μF 50V
R37 56K
R43 68K
C14 47μF 10V
R80 27K
D5
R38 22K
C17 47μF 35V
R39 12K
R40 1.8M
R41 47K
VR2 10K AGC SET
TP3 (YH)
CF11 Y.LPF
CF4 Y.LPF
3.2MHz
R101 680
R44 22K
R46 120K
R123 180K
C19 47μF 10V
AIC SET
WHITE SET
LEVEL IND
TRACKING
FADE CONT
EXT TITLE VIDEO
EXT TITLE CONT
Q5
Q4
Q6
Q1
R19 3.3K
R17 12K
R18 3.3K
R24 2.2K
R21 3.9K
R23 39K
R6 47K
R7 22K
R4 12K
R5 6.8K
C103 1000PF
Q1,Q4–Q6 EXT TITLE CONTROL
R56 2.2K
L1 180μH
R22 2.2K
C13 33PF
RED AND BLUE SEPARATION
VR4 R/B GAIN
VR5 R/B SEPARATION–2
TP4 (V. EDGE)
R59 1.5K
R57 1K
R4 3.3K
DL1
1H DL
L3 10μH
L4 10μH
R54 560
VR5 2.2K
R49 1K
R48 10K
R103 5.6K
C24 0.047μF
R53 430
R253 10K
D4
TP2 (TRACKING)
IC3
R/B GAIN CONT
PRE BL MIX
V. TRANSIENT SPURIOUS CORRECTION
MIX
+1.8V REG
TRACKING SIGNAL GENERATOR
90° PHASE SHIFTER
WHITE CLIP
NAM
PULSE SEPA
V EDGE AMP
DETECT
CF3 DL
CT2 30PF
CT2 R/B SEPARATION–1
R55 270K
C20 22μF 10V
C21 47μF10V
R47 15K
C93 47PF
R51 15K
PRE BL
CHROMA CLIP
L10 8.2μH
R198 270
C22 47μF10V
VR20 47K CHROMA CLIP
D9
Q13
R106 1.5K
R105 2.2K
C67 47μF 10V
R104 22K
C45
Y(EDGE)
CHROMA PROCESSING
VR8 B TRACKING–3
VR7 B TRACKING–1
VR6 B TRACKING–2
R81 5.6M
R63 33K
R64 33K
BVR 1
BVR 2
IC4
B SHADING/ TRACKING CORRECTION
R SHADING/ TRACKING CORRECTION
R/B SEPA-RATION
GAIN CONTROL
PRE BL MIX
AMP
DETECT
LPF
B–YL AMP
R–YL AMP
C27 2200PF
C23 0.047μF
C92 0.047μF
C25 33PF
B. GAIN
R. GAIN
R66 10K
R72 22K
R70 22K
VR13 470 R PED
R75 56K
C28 33PF
C26 47μF 10V
C97 1000P F
R74 1.8M
R73 4.7K
R82 1.5M
R71 82K
VR12 10K R GAIN
R79 330K
R78 390K
R65 300K
C96 1000PF
C100 0.47μF 50V
VR9 R TRACKING–3
VR10 R TRACKING–1
VR11 R TRACKING–2
Q31 B–YL MATRIX
R52 10K
R223 1K
D3
C104 47μF 10V
R220 1K
R222 68K
R224 220K
D13
CT3 YL PHASE
R77 39K
CT3 70PF
R148 1K
R150 8.2K
Q17
R149 1.8K
R151 1K
Q17 YL PHASE
R76 6.8K
SW1 YL ON/OFF SWITCH
B–YL
YL
R–YL
AGC AUTO
VTR COMPATI
A
B
C
D
E
1
2
3
4
5

CHEMATIC DIAGRAM OF PROCESS BOARD (YFVPKA2003EA)

V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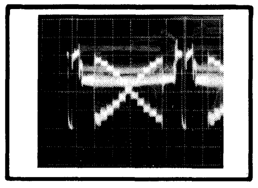
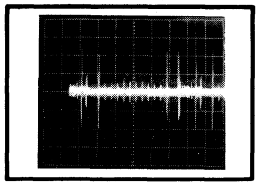
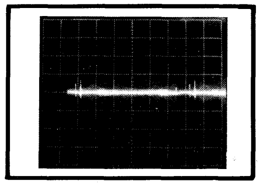

8 0.2V/DIV, 10µs/DIV


9 0.2V/DIV, 10µs/DIV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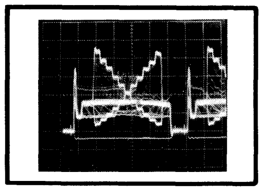
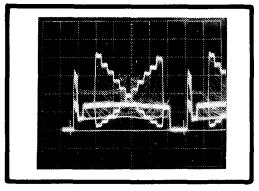
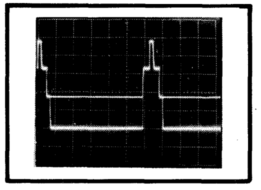
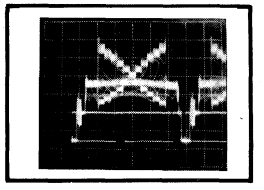
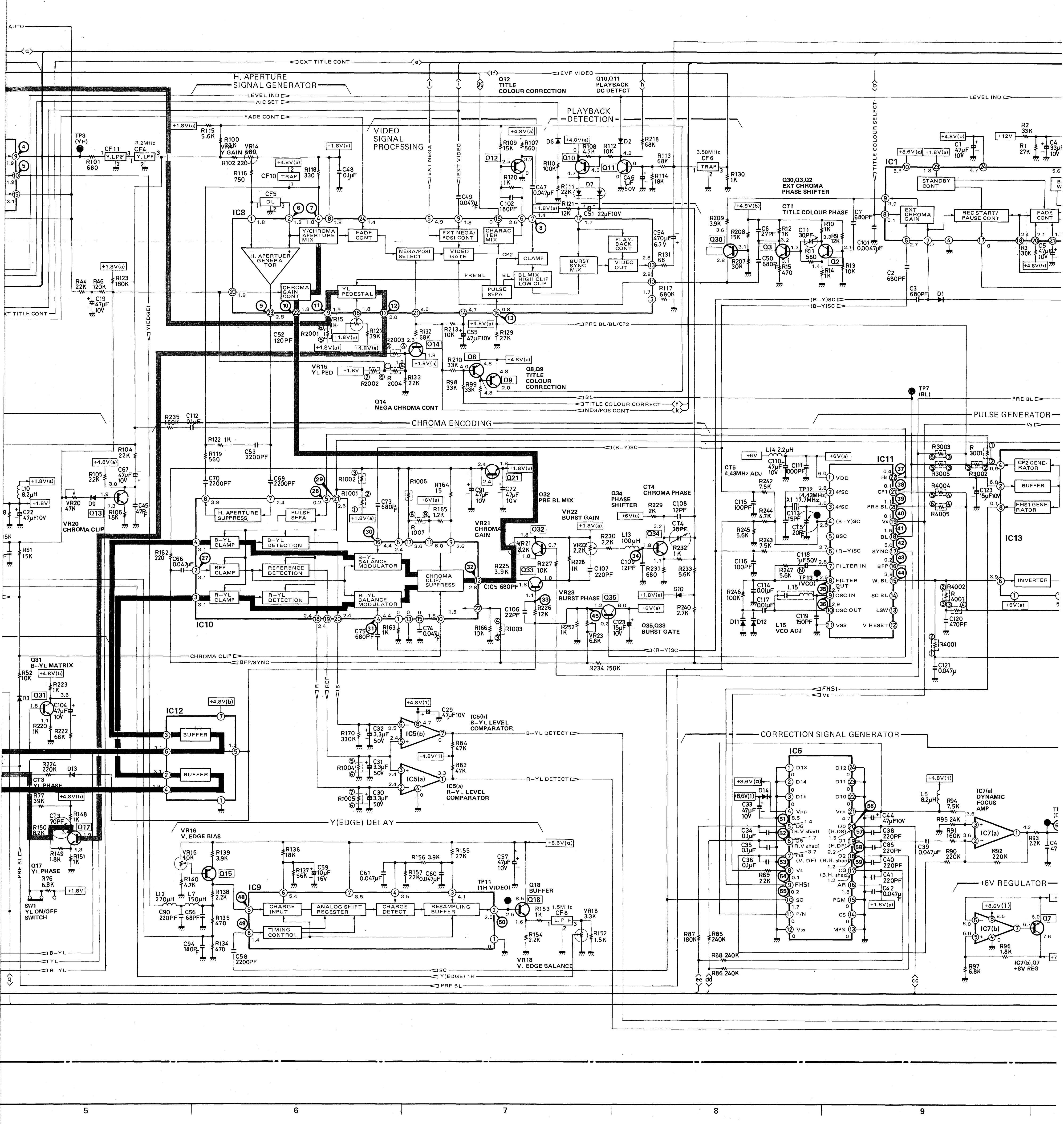

11 0.1V/DIV, 10µs/DIV

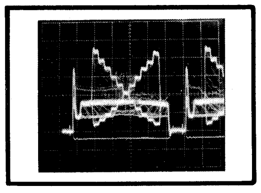

12 0.1V/DIV, 10µs/DIV


13 1V/DIV, 10µs/DIV


14 0.2V/DIV, 10µs/DIV


AUTO
EXT TITLE CONT
H. APERTURE SIGNAL GENERATOR
LEVEL IND
AIC SET
FADE CONT
VIDEO SIGNAL PROCESSING
EXT NEGA
EXT VIDEO
EVF VIDEO
Q12 TITLE COLOUR CORRECTION
Q10,Q11 PLAYBACK DC DETECT
PLAYBACK DETECTION
TITLE COLOUR SELECT
LEVEL IND
IC8
IC1
TP3 (Y·H)
Y.LPF
CF4 3.2MHz
H. APERTUER GENERATOR
Y/CHROMA APERTURE MIX
FADE CONT
NEGA/POSI SELECT
EXT NEGA/POSI CONT
VIDEO GATE
CHARACTER MIX
CLAMP
BURST SYNC MIX
BL MIX HIGH CLIP LOW CLIP
PULSE SEPA
PLAY-BACK CONT
VIDEO OUT
CHROMA GAIN CONT
YL PEDESTAL
VR15 YL PED
Q14 NEGA CHROMA CONT
Q8,Q9 TITLE COLOUR CORRECTION
CF6 3.58MHz TRAP
Q30,Q3,Q2 EXT CHROMA PHASE SHIFTER
CT1 TITLE COLOUR PHASE
STANDBY CONT
EXT CHROMA GAIN
REC START/ PAUSE CONT
FADE CONT
TP7 (BL)
PRE BL
PULSE GENERATOR
Y(EDGE)
EXT TITLE CONT
PRE BL/BL/CP2
BL
TITLE COLOUR CORRECT
NEG/POS CONT
CHROMA ENCODING
(R−Y)SC
(B−Y)SC
VR20 CHROMA CLIP
IC10
H. APERTURE SUPPRESS
PULSE SEPA
B−YL CLAMP
B−YL DETECTION
BFP CLAMP
REFERENCE DETECTION
R−YL CLAMP
R−YL DETECTION
B−YL BALANCE MODULATOR
R−YL BALANCE MODULATOR
CHROMA CLIP/ SUPPRESS
VR21 CHROMA GAIN
Q32 PRE BL MIX
VR22 BURST GAIN
VR23 BURST PHASE
Q34 PHASE SHIFTER
CT4 CHROMA PHASE
Q35,Q33 BURST GATE
CHROMA CLIP
BFP/SYNC
IC11
CT5 4.43MHz ADJ
X1 17.7MHz (4.43MHz)
TP13 (VCO)
L15 VCO ADJ
VDD
4fSC
(B−Y)SC
BSC
(R−Y)SC
FILTER IN
FILTER OUT
OSC IN
OSC OUT
VSS
V RESET
LSW
SC BL
W. BL
BFP
SYNC
BL
Vs
PRE BL
CP1
Hs
IC13
CP2 GENERATOR
BUFFER
FHS1 GENERATOR
INVERTER
Q31 B−YL MATRIX
IC12
BUFFER
BUFFER
CT3 YL PHASE
Q17 YL PHASE
SW1 YL ON/OFF SWITCH
R
REF
B
IC5(b) B−YL LEVEL COMPARATOR
B−YL DETECT
IC5(a) R−YL LEVEL COMPARATOR
R−YL DETECT
Y(EDGE) DELAY
VR16 V. EDGE BIAS
IC9
CHARGE INPUT
ANALOG SHIFT REGESTER
CHARGE DETECT
RESAMPLING BUFFER
TIMING CONTROL
TP11 (1H VIDEO)
Q18 BUFFER
CF8 1.5MHz L.P.F
VR18 V. EDGE BALANCE
B−YL
YL
R−YL
PRE BL
SC
Y(EDGE) 1H
FHS1
Vs
CORRECTION SIGNAL GENERATOR
IC6
IC7(a) DYNAMIC FOCUS AMP
+6V REGULATOR
IC7(b),Q7 +6V REG
5
6
7
8
9

(YFVPKA2003EA)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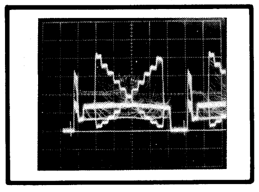
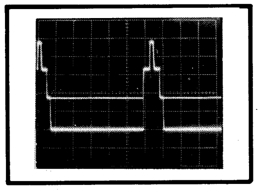
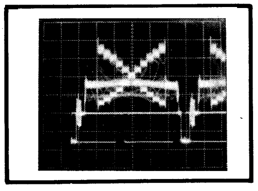

12 0.1V/DIV, 10μs/DIV


13 1V/DIV, 10μs/DIV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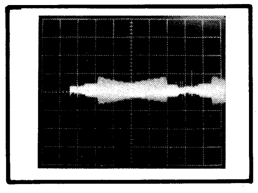
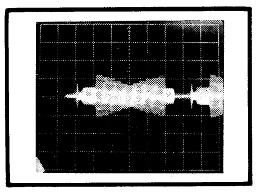
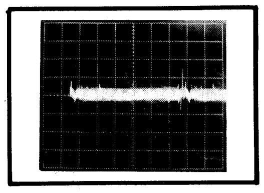
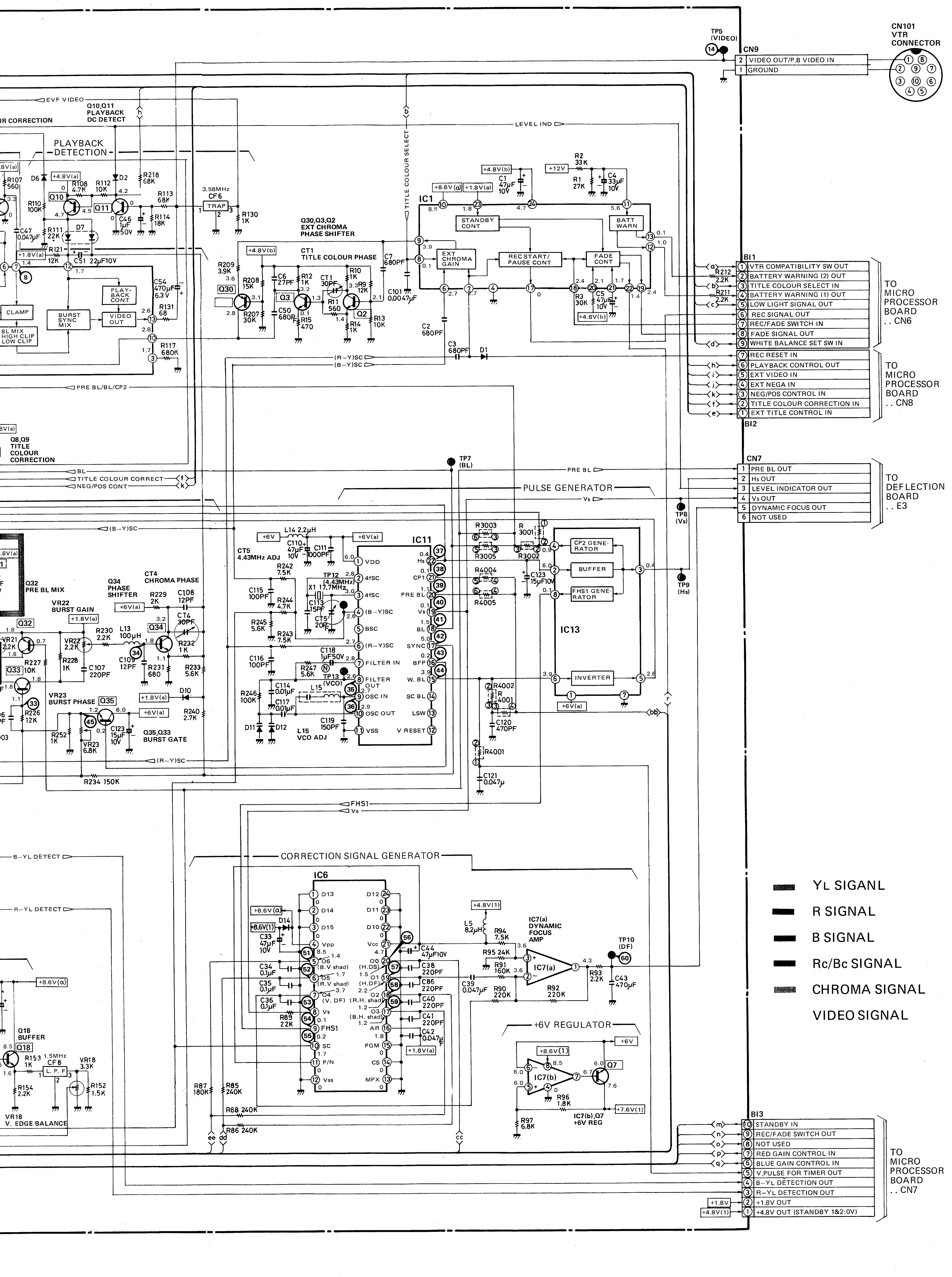

15 20V/DIV, 10μs/DIV


16 0.2V/DIV, 10μs/DIV


17 0.1V/DIV, 10μs/DIV


TP5 (VIDEO)
CN9
2 VIDEO OUT/P.B VIDEO IN
1 GROUND
CN101 VTR CONNECTOR
PLAYBACK DETECTION
Q10,Q11 PLAYBACK DC DETECT
EVF VIDEO
LEVEL IND
TITLE COLOUR SELECT
IC1
STANDBY CONT
BATT WARN
EXT CHROMA GAIN
REC START/PAUSE CONT
FADE CONT
Q30,Q3,Q2 EXT CHROMA PHASE SHIFTER
CT1 TITLE COLOUR PHASE
CLAMP
BURST SYNC MIX
VIDEO OUT
PLAY-BACK CONT
BL MIX HIGH CLIP LOW CLIP
Q8,Q9 TITLE COLOUR CORRECTION
PRE BL/BL/CP2
TITLE COLOUR CORRECT
NEG/POS CONT
BI1
1 VTR COMPATIBILITY SW OUT
2 BATTERY WARNING (2) OUT
3 TITLE COLOUR SELECT IN
4 BATTERY WARNING (1) OUT
5 LOW LIGHT SIGNAL OUT
6 REC SIGNAL OUT
7 REC/FADE SWITCH IN
8 FADE SIGNAL OUT
9 WHITE BALANCE SET SW IN
TO MICRO PROCESSOR BOARD ..CN6
7 REC RESET IN
6 PLAYBACK CONTROL OUT
5 EXT VIDEO IN
4 EXT NEGA IN
3 NEG/POS CONTROL IN
2 TITLE COLOUR CORRECTION IN
1 EXT TITLE CONTROL IN
BI2
TO MICRO PROCESSOR BOARD ..CN8
CN7
1 PRE BL OUT
2 Hs OUT
3 LEVEL INDICATOR OUT
4 Vs OUT
5 DYNAMIC FOCUS OUT
6 NOT USED
TO DEFLECTION BOARD ..E3
TP7 (BL)
PULSE GENERATOR
TP8 (Vs)
TP9 (Hs)
IC11
IC13
CP2 GENE-RATOR
BUFFER
FHS1 GENE-RATOR
INVERTER
CT5 4.43MHz ADJ
L15 VCO ADJ
Q32 PRE BL MIX
Q34 PHASE SHIFTER
CT4 CHROMA PHASE
VR22 BURST GAIN
VR23 BURST PHASE
Q35,Q33 BURST GATE
CORRECTION SIGNAL GENERATOR
IC6
IC7(a) DYNAMIC FOCUS AMP
TP10 (DF)
+6V REGULATOR
IC7(b),Q7 +6V REG
Q18 BUFFER
VR18 V. EDGE BALANCE
B-YL DETECT
R-YL DETECT
BI3
10 STANDBY IN
9 REC/FADE SWITCH OUT
8 NOT USED
7 RED GAIN CONTROL IN
6 BLUE GAIN CONTROL IN
5 V.PULSE FOR TIMER OUT
4 B-YL DETECTION OUT
3 R-YL DETECTION OUT
2 +1.8V OUT
1 +4.8V OUT (STANDBY 1&2:0V)
TO MICRO PROCESSOR BOARD ..CN7
8
9
10

▨ YL SIGANL

▬ R SIGNAL

▬ B SIGNAL

▬ Rc/Bc SIGNAL

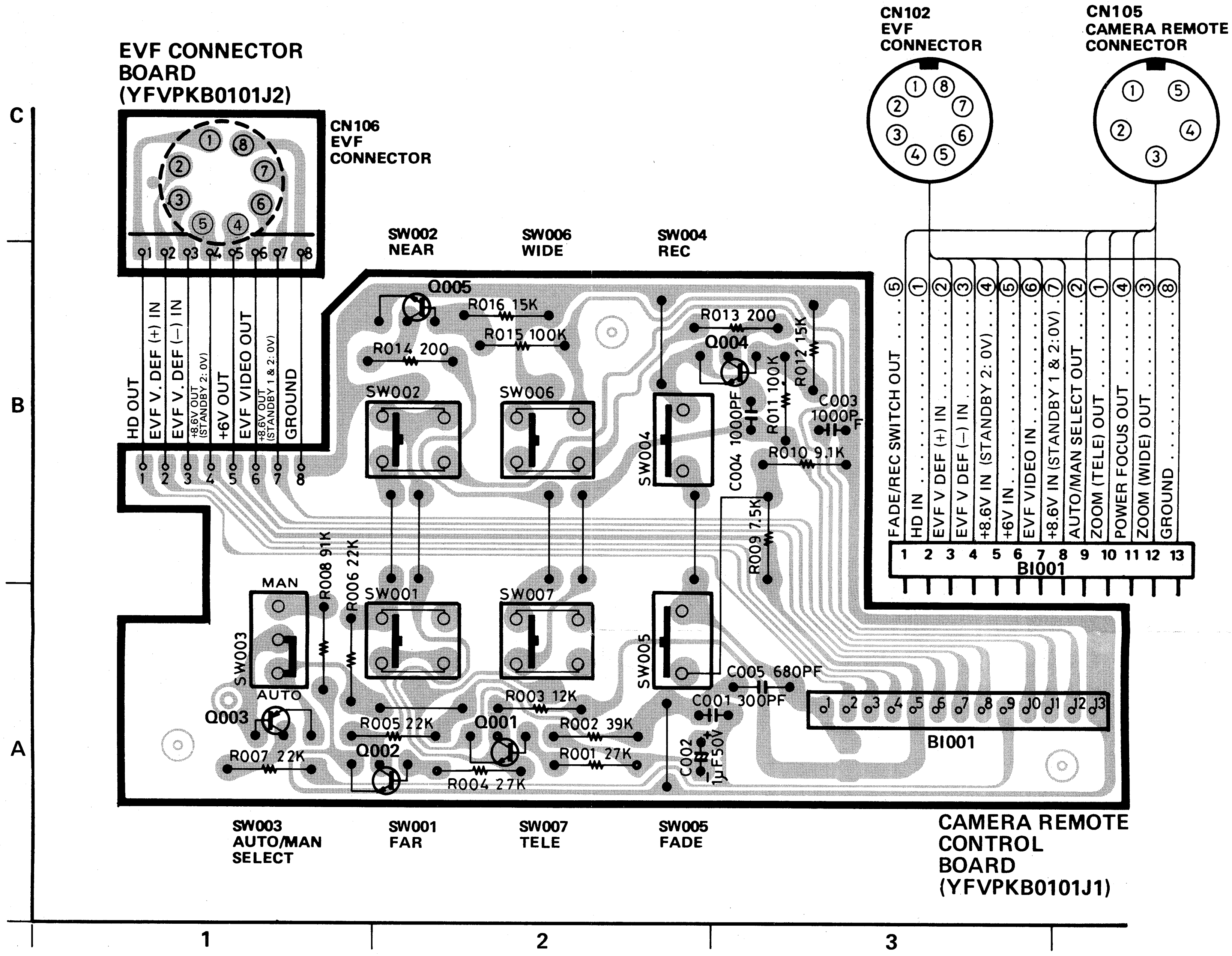
▨ CHROMA SIGNAL

VIDEO SIGNAL

PROCESS BOARD

IC1	AN2560S		E9
IC2	AN2110S		E3, E4
IC3	AN2310S		C4, C3
IC4	AN2320S		B3, B4
IC5	AN6914S		B7
IC6	YFH4151KIT		B8
IC7	NJM3414M		A9,B9
IC8	AN2210SA		E6, E7
IC9	MN8037		A6
IC10	AN2410S		C6
IC11	MN6160PBS		C9
IC12	EHMB09H85		B5, B6
IC13	MT0001		C9, C10
Q1	2SB709-QRS	[A]	D4
Q2	2SC2404-CD	[U]	E8
Q3	2SD601-QRS	[Y]	E8
Q4	2SD601-QRS	[Y]	D4
Q5	2SD601-QRS	[Y]	D4
Q6	2SD601-QRS	[Y]	D4
Q7	2SD602-QRS	[W]	A10
Q8	2SB709-QRS	[A]	D7
Q9	2SB709-QRS	[A]	D7
Q10	2SB709-QRS	[A]	E7
Q11	2SD601-QRS	[Y]	E8
Q12	2SB709-QRS	[A]	E6
Q13	2SD601-QRS	[Y]	C5
Q14	2SD601-QRS	[Y]	D7
Q15	2SB709-QRS	[A]	B6
Q17	2SD601-QRS	[Y]	B5
Q18	2SD601-QRS	[Y]	A7
Q21	2SD601-QRS	[Y]	C7, D7
Q30	2SB709-QRS	[A]	E8
Q31	2SC2404-CD	[V]	B5
Q32	2SD601-QRS	[Y]	C7
Q33	2SC2404-CD	[V]	C7
Q34	2SC2404-CD	[V]	C8
Q35	2SC2404-CD	[V]	C9
D1	MA151K	[MH]	D9
D2	MA151K	[MH]	E8
D3	MA151K	[MH]	B5
D4	MA151A	[MA]	C3
D5	MA151K	[MH]	D4
D6	MA151K	[MH]	E7
D7	MA151WA	[MN]	E7
D9	MA151K	[MH]	C5
D10	MA151K	[MH]	C8
D11	YUD1S2688		C8
D12	YUD1S2688		C8
D13	MA151K	[MH]	B5
D14	MA165		B7

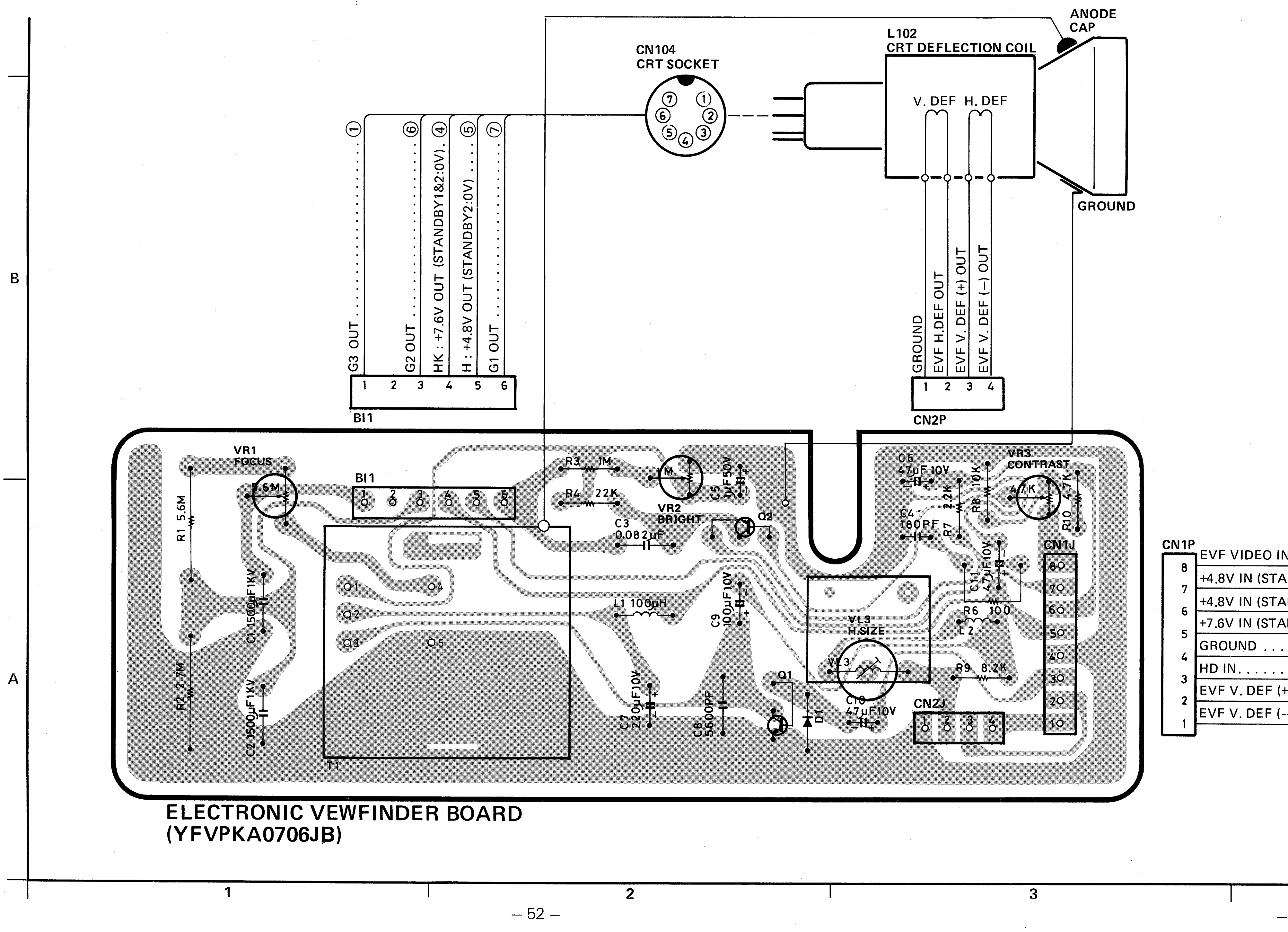
CONDUCTOR VIEW OF CAMERA REMOTE CONTROL BOARD (WV-CR10)


EVF CONNECTOR BOARD (YFVPKB0101J2)
CN106 EVF CONNECTOR
CN102 EVF CONNECTOR
CN105 CAMERA REMOTE CONNECTOR
HD OUT
EVF V. DEF (+) IN
EVF V. DEF (–) IN
+8.6V OUT (STANDBY 2: 0V)
+6V OUT
EVF VIDEO OUT
+8.6V OUT (STANDBY 1 & 2: 0V)
GROUND
SW002 NEAR
SW006 WIDE
SW004 REC
SW003 AUTO/MAN SELECT
SW001 FAR
SW007 TELE
SW005 FADE
MAN
AUTO
Q001
Q002
Q003
Q004
Q005
R001 27K
R002 39K
R003 12K
R004 27K
R005 22K
R006 22K
R007 22K
R008 91K
R009 7.5K
R010 9.1K
R011 100K
R012 15K
R013 200
R014 200
R015 100K
R016 15K
C001 300PF
C002 1μF50V
C003 1000PF
C004 1000PF
C005 680PF
BI001
FADE/REC SWITCH OUT ⑤
HD IN ①
EVF V DEF (+) IN ②
EVF V DEF (–) IN ③
+8.6V IN (STANDBY 2: 0V) ④
+6V IN ⑤
EVF VIDEO IN ⑥
+8.6V IN (STANDBY 1 & 2:0V) ⑦
AUTO/MAN SELECT OUT ②
ZOOM (TELE) OUT ①
POWER FOCUS OUT ④
ZOOM (WIDE) OUT ③
GROUND ⑧
CAMERA REMOTE CONTROL BOARD (YFVPKB0101J1)
A
B
C
1
2
3

CAM

Q001
Q002
Q003
Q004
Q005

CONDUCTOR VIEW OF ELECTRONIC VIEWFINDER BOARD (YFVPKA0706JB)

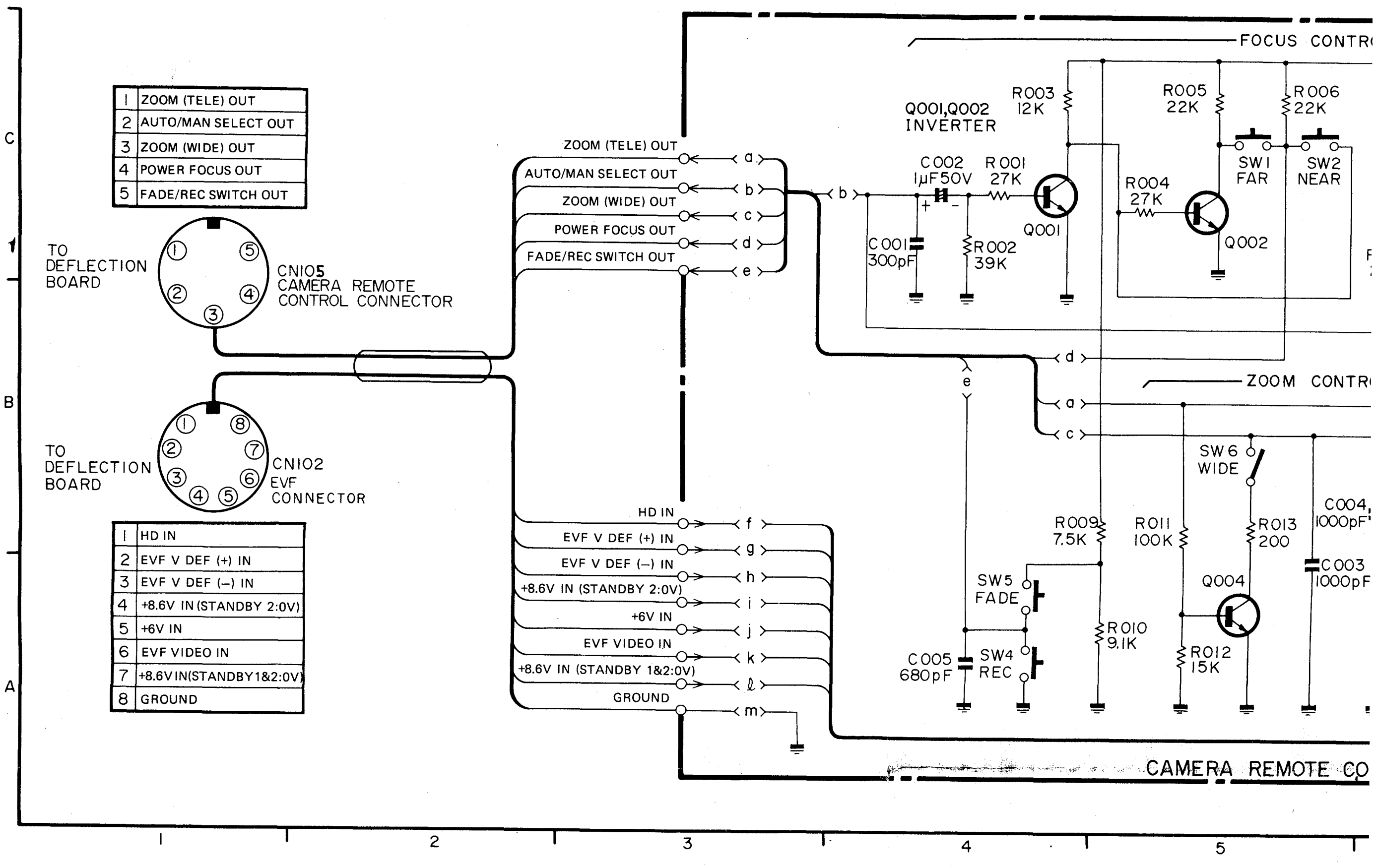

ANODE CAP
L102 CRT DEFLECTION COIL
V. DEF
H. DEF
CN104 CRT SOCKET
GROUND
G3 OUT ①
G2 OUT ⑥
HK : +7.6V OUT (STANDBY1&2:0V) ④
H : +4.8V OUT (STANDBY2:0V) ⑤
G1 OUT ⑦
BI1
GROUND
EVF H.DEF OUT
EVF V. DEF (+) OUT
EVF V. DEF (–) OUT
CN2P
VR1 FOCUS
5.6M
R1 5.6M
R2 2.7M
C1 1500μF1KV
C2 1500μF1KV
T1
R3 1M
R4 22K
C3 0.082μF
L1 100μH
VR2 BRIGHT
C5 1μF50V
C9 100μF10V
C7 220μF10V
C8 5600PF
Q1
Q2
D1
VL3 H.SIZE
C10 47μF10V
CN2J
C6 47μF 10V
C4 180PF
R7 2.2K
R8 10K
VR3 CONTRAST
4.7K
R10 4.7K
C11 47μF10V
R6 100
L2
R9 8.2K
CN1J
CN1P
EVF VIDEO IN
+4.8V IN (STANDBY2:0V)
+4.8V IN (STANDBY1&2:0V)
+7.6V IN (STANDBY1&2:0V)
GROUND
HD IN
EVF V. DEF (+) IN
EVF V. DEF (–) IN
ELECTRONIC VEWFINDER BOARD (YFVPKA0706JB)
A
B
1
2
3
4

EVF BOARD

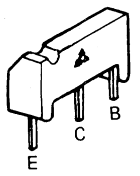
Q1	2SD1083
Q2	2SB642-Q
D1	MA165

DTE

SCHEMATIC DIAGRAM OF CAMERA REMOTE CO


1 ZOOM (TELE) OUT
2 AUTO/MAN SELECT OUT
3 ZOOM (WIDE) OUT
4 POWER FOCUS OUT
5 FADE/REC SWITCH OUT
TO DEFLECTION BOARD
CN105 CAMERA REMOTE CONTROL CONNECTOR
TO DEFLECTION BOARD
CN102 EVF CONNECTOR
1 HD IN
2 EVF V DEF (+) IN
3 EVF V DEF (–) IN
4 +8.6V IN (STANDBY 2:0V)
5 +6V IN
6 EVF VIDEO IN
7 +8.6V IN(STANDBY 1&2:0V)
8 GROUND
FOCUS CONTR
Q001,Q002 INVERTER
R003 12K
R005 22K
R006 22K
C002 1μF50V
R001 27K
R004 27K
SW1 FAR
SW2 NEAR
Q001
Q002
C001 300pF
R002 39K
ZOOM CONTR
SW6 WIDE
R009 7.5K
R011 100K
R013 200
C004 1000pF
C003 1000pF
Q004
SW5 FADE
R010 9.1K
R012 15K
C005 680pF
SW4 REC
CAMERA REMOTE CO
C
B
A
1
2
3
4
5

2SD636-QR
2SB788-STU



CAMERA REMOTE CONTROL BOARD

Q001	2SD636-QR	A2
Q002	2SD636-QR	A2
Q003	2SB788-STU	A1
Q004	2SD636-QR	B3
Q005	2SD636-QR	B2

B)

SCHEMATIC DIAGRAM OF ELECTRONIC VIEWFINDE

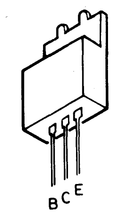
PRODUCT SAFETY NOTE

The shaded area on this schematic diagram incorporates special features important for protection from X-Radiation, fire and electrical shock hazards. When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

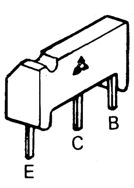
VF BOARD

	2SD1083	A2
	2SB642-QRS	A2
	MA165	A2

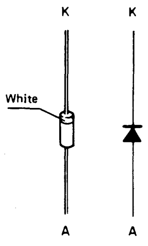
2SD1083



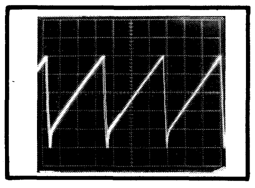
2SB642-QRS



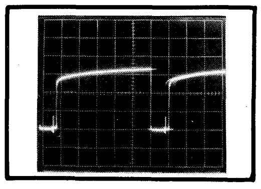
MA165



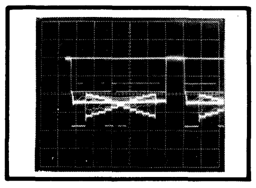
1 0.5V/DIV, 5msec/DIV



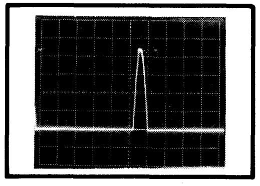
2 0.5V/DIV, 10μsec/DIV



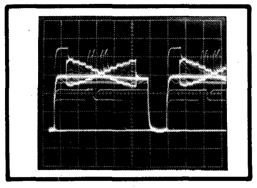
3 1V/DIV, 10μsec/DIV



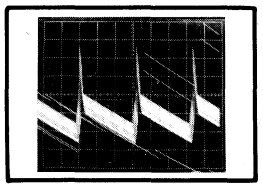
4 1V/DIV, 10μsec/DIV



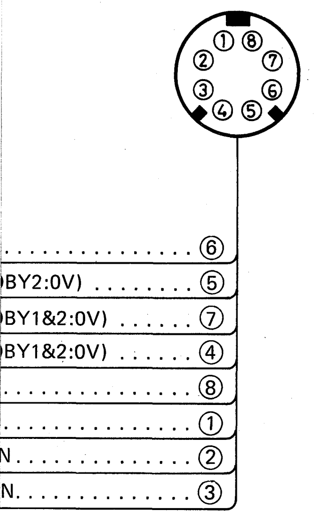
5 20V/DIV, 10μsec/DIV

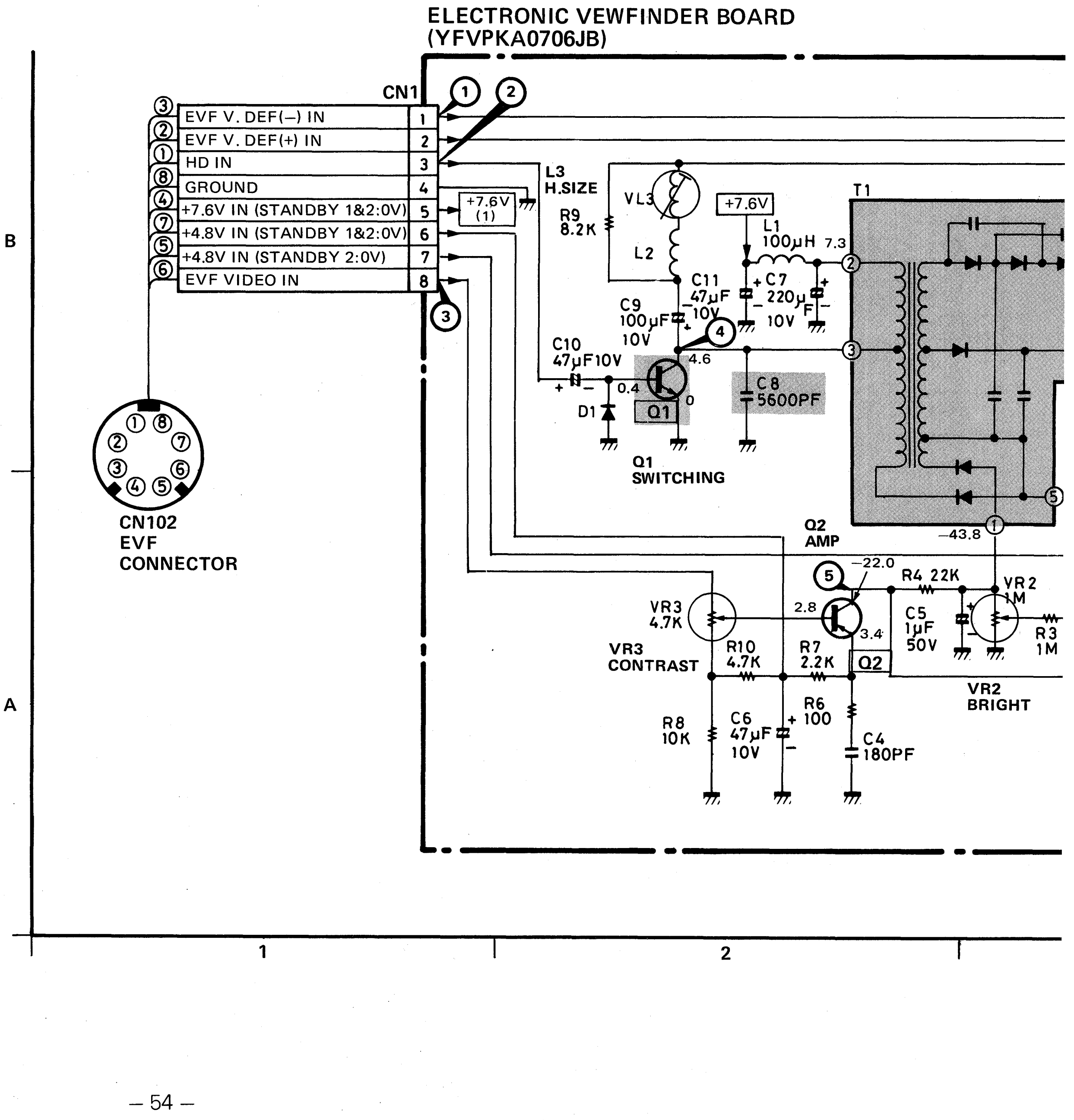


6 2V/DIV, 20μsec/DIV



CN102
EVF CONNECTOR

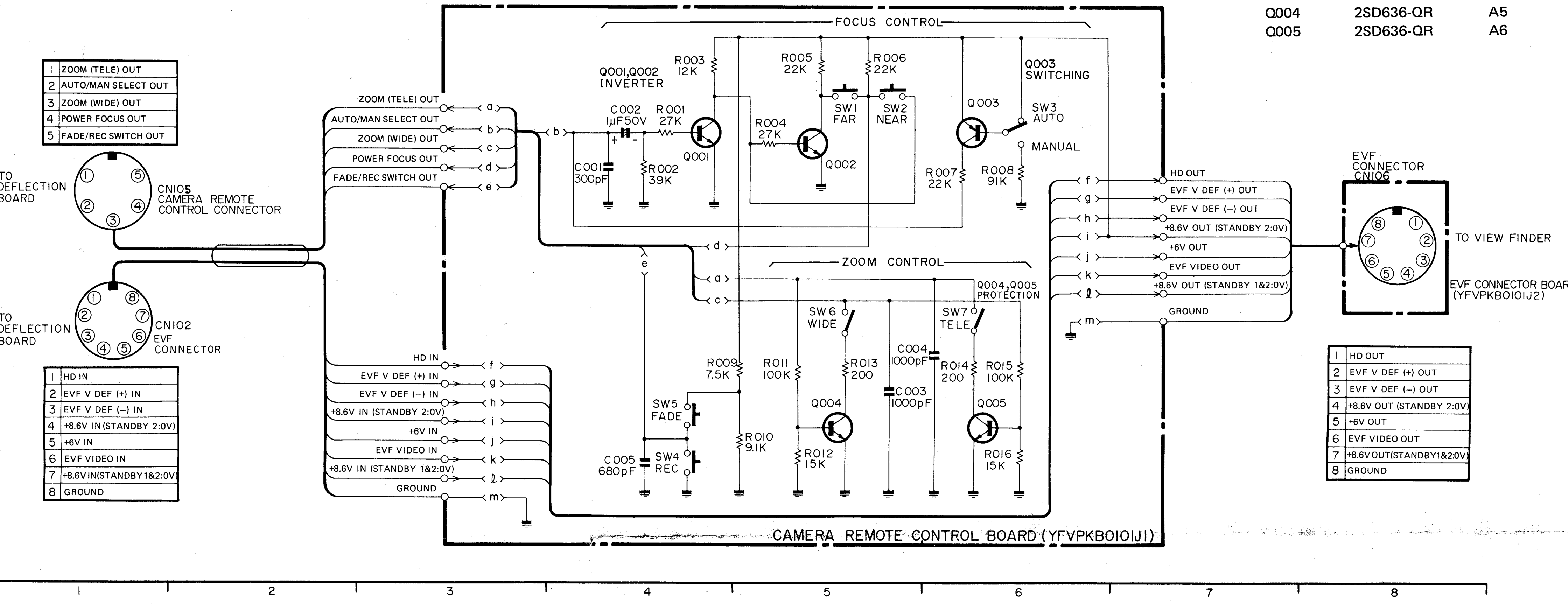

.............⑥
BY2:0V) ....⑤
BY1&2:0V) ......⑦
BY1&2:0V) ......④
.............⑧
.............①
N.............②
N.............③


ELECTRONIC VEWFINDER BOARD
(YFVPKA0706JB)
CN1
1 EVF V. DEF(–) IN
2 EVF V. DEF(+) IN
3 HD IN
4 GROUND
5 +7.6V IN (STANDBY 1&2:0V)
6 +4.8V IN (STANDBY 1&2:0V)
7 +4.8V IN (STANDBY 2:0V)
8 EVF VIDEO IN
CN102 EVF CONNECTOR
+7.6V (1)
L3 H.SIZE
R9 8.2K
VL3
L2
+7.6V
L1 100μH
7.3
T1
C11 47μF 10V
C7 220μF 10V
C9 100μF 10V
C10 47μF10V
D1
0.4
4.6
Q1
C8 5600PF
Q1 SWITCHING
Q2 AMP
–43.8
–22.0
R4 22K
VR2 1M
VR3 4.7K
VR3 CONTRAST
2.8
3.4
C5 1μF 50V
R3 1M
R10 4.7K
R7 2.2K
Q2
VR2 BRIGHT
R6 100
R8 10K
C6 47μF 10V
C4 180PF
B
A
1
2

SCHEMATIC DIAGRAM OF CAMERA REMOTE CONTROL BOARD (WV-CR10)

CAMERA REMOTE CONTROL BOARD

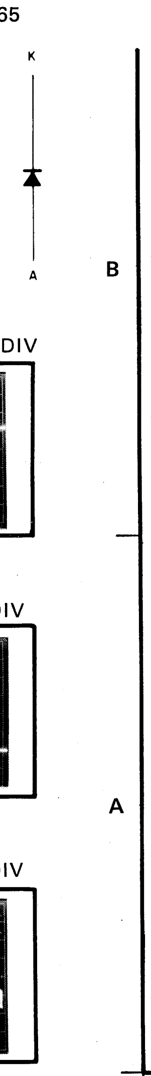
Q001	2SD636-QR	C4
Q002	2SD636-QR	C4
Q003	2SB788-STU	C6
Q004	2SD636-QR	A5
Q005	2SD636-QR	A6

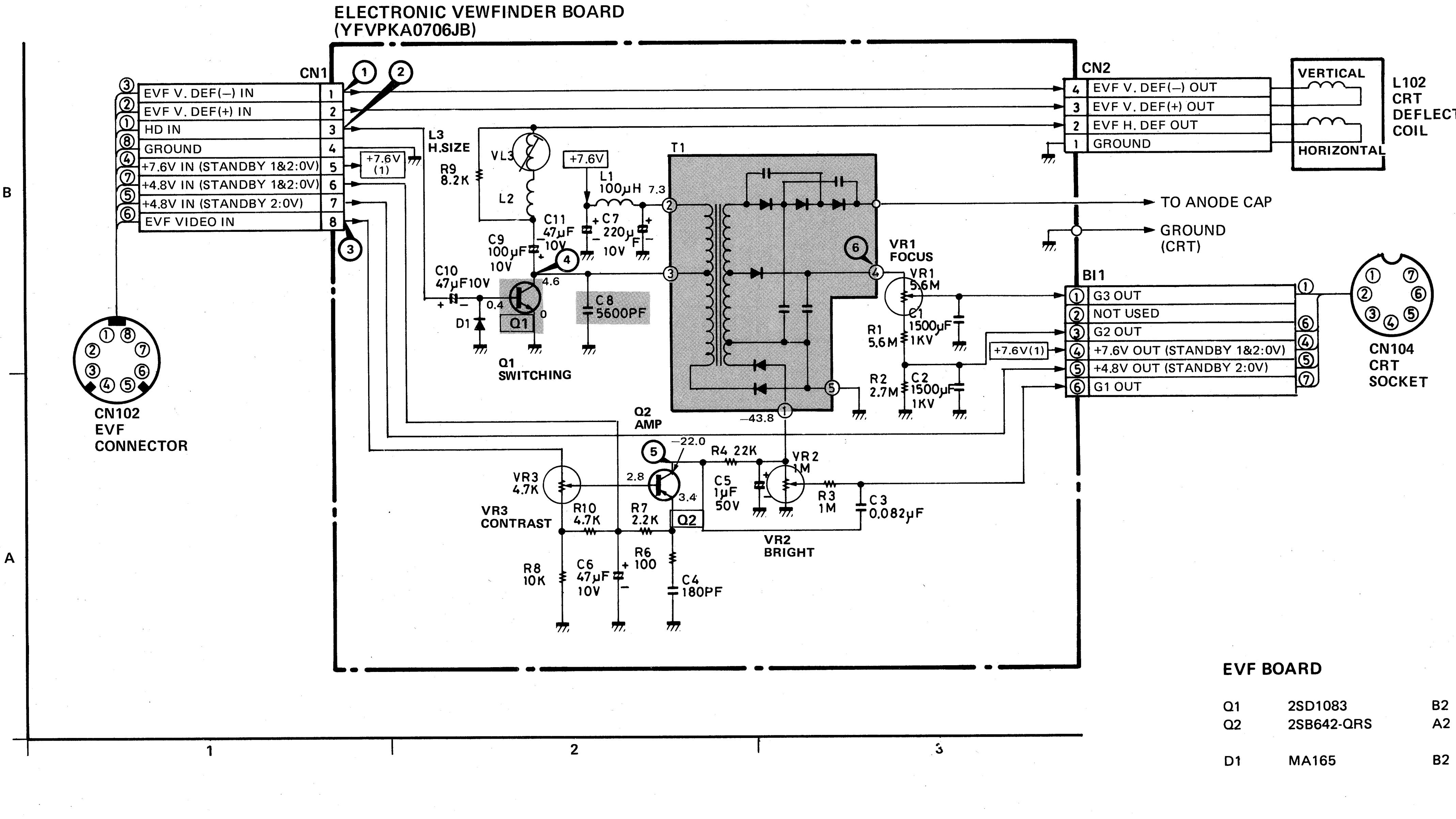

1 ZOOM (TELE) OUT
2 AUTO/MAN SELECT OUT
3 ZOOM (WIDE) OUT
4 POWER FOCUS OUT
5 FADE/REC SWITCH OUT
TO DEFLECTION BOARD
CN105 CAMERA REMOTE CONTROL CONNECTOR
TO DEFLECTION BOARD
CN102 EVF CONNECTOR
1 HD IN
2 EVF V DEF (+) IN
3 EVF V DEF (–) IN
4 +8.6V IN (STANDBY 2:0V)
5 +6V IN
6 EVF VIDEO IN
7 +8.6V IN (STANDBY 1&2:0V)
8 GROUND
ZOOM (TELE) OUT
AUTO/MAN SELECT OUT
ZOOM (WIDE) OUT
POWER FOCUS OUT
FADE/REC SWITCH OUT
HD IN
EVF V DEF (+) IN
EVF V DEF (–) IN
+8.6V IN (STANDBY 2:0V)
+6V IN
EVF VIDEO IN
+8.6V IN (STANDBY 1&2:0V)
GROUND
FOCUS CONTROL
Q001,Q002 INVERTER
C002 1μF50V
R001 27K
R003 12K
C001 300pF
R002 39K
Q001
R004 27K
Q002
R005 22K
R006 22K
SW1 FAR
SW2 NEAR
Q003 SWITCHING
Q003
SW3 AUTO
MANUAL
R007 22K
R008 91K
ZOOM CONTROL
Q004,Q005 PROTECTION
SW6 WIDE
SW7 TELE
SW5 FADE
SW4 REC
C005 680pF
R009 7.5K
R010 9.1K
R011 100K
R012 15K
R013 200
Q004
C004 1000pF
C003 1000pF
R014 200
R015 100K
Q005
R016 15K
CAMERA REMOTE CONTROL BOARD (YFVPKB0101J1)
HD OUT
EVF V DEF (+) OUT
EVF V DEF (–) OUT
+8.6V OUT (STANDBY 2:0V)
+6V OUT
EVF VIDEO OUT
+8.6V OUT (STANDBY 1&2:0V)
GROUND
EVF CONNECTOR CN106
TO VIEW FINDER
EVF CONNECTOR BOARD (YFVPKB0101J2)
1 HD OUT
2 EVF V DEF (+) OUT
3 EVF V DEF (–) OUT
4 +8.6V OUT (STANDBY 2:0V)
5 +6V OUT
6 EVF VIDEO OUT
7 +8.6V OUT(STANDBY1&2:0V)
8 GROUND
1
2
3
4
5
6
7
8

SCHEMATIC DIAGRAM OF ELECTRONIC VIEWFINDER BOARD (YFVPKA0706JB)

atures important
. When servicing
for the critical

65


K
A
B
DIV
IV
A
IV


ELECTRONIC VEWFINDER BOARD (YFVPKA0706JB)
CN1
EVF V. DEF(–) IN
EVF V. DEF(+) IN
HD IN
GROUND
+7.6V IN (STANDBY 1&2:0V)
+4.8V IN (STANDBY 1&2:0V)
+4.8V IN (STANDBY 2:0V)
EVF VIDEO IN
CN102 EVF CONNECTOR
+7.6V (1)
L3 H.SIZE
R9 8.2K
VL3
L2
+7.6V
L1 100μH
7.3
C11 47μF 10V
C7 220μF 10V
C9 100μF 10V
C10 47μF10V
0.4
4.6
D1
Q1
Q1 SWITCHING
C8 5600PF
T1
VR1 FOCUS
VR1 5.6M
R1 5.6M
C1 1500μF 1KV
R2 2.7M
C2 1500μF 1KV
-43.8
Q2 AMP
-22.0
R4 22K
VR2 1M
2.8
3.4
Q2
VR3 4.7K
VR3 CONTRAST
R10 4.7K
R7 2.2K
C5 1μF 50V
R3 1M
C3 0.082μF
VR2 BRIGHT
R8 10K
C6 47μF 10V
R6 100
C4 180PF
CN2
EVF V. DEF(–) OUT
EVF V. DEF(+) OUT
EVF H. DEF OUT
GROUND
VERTICAL
HORIZONTAL
L102 CRT DEFLECT COIL
TO ANODE CAP
GROUND (CRT)
BI1
G3 OUT
NOT USED
G2 OUT
+7.6V OUT (STANDBY 1&2:0V)
+4.8V OUT (STANDBY 2:0V)
G1 OUT
+7.6V(1)
CN104 CRT SOCKET
1
2
3

EVF BOARD

Q1	2SD1083	B2
Q2	2SB642-QRS	A2
D1	MA165	B2

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A–314

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Service Manual

Vol. 4

Replacement Parts List
Exploded View

Color Video Camera

WVP-200E/WVP-200N

CONTENTS

PARTS LIST

Camera

- Miscellaneous 1
- Preamplifier Board (YFVPKA2002EA) . . . . 1~2
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- Microprocessor Board (YFVPKA2004EA) . . . . 7~8
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- REC Switch Board (YWV3100ZK07) 9
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- Microphone Assembly (WM-4031) 10
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- EVF Miscellaneous (YFVAKA0164AN) 10
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Camera Remote Controller (WV-CR10)

- Miscellaneous 12
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- Electroric Viewfinder 15
- Auto Focus Lens Unit 16
- Camera Remote Controller 17
- Packaging of Camera 18
- Packaging of Camera Remote Controller 19

National/Panasonic

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

Vol. 4

Important Notice

REPLACEMENT PARTS LIST

1. Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
2. Components identified by * mark are new parts used from this model.

WVP-200E/WVP-200N

MISCELLANEOUS

SYMBOL NO.	PART NO.	DESCRIPTION
V101	*YFH4151KIT	Pick-up Tube Kit
X102	YFXTALLPFC70	Crystal Filter
C101	ECQ16682N66	Ceramic 6800PF 1500V
L101	*YFH4151KIT	Deflection Coil Assy
SW101	*D2MQ1L	Micro Switch
SW102	*D2MQ1L	Micro Switch
E101	*YFFA-0003	Bias Light Assy
CN101	* YFCABLE3230	Camera Cable and VTR Connector
CN102	* D8113N601	8 pin EVF Connector
CN103	* VIDSOKETC70	Pick-up Tube Socket
CN107	* EMCUSA20D04	Lens Connector
M1	* YFV5EB0124A1	Upper Cover
M2	* YFV5EB0125A1	Handle Cover
M3	YFV5EA0216AS	Display key Cover Assy
M4	* YFV2SA0078A4	Mounting Angle for Circuit Board
M5	*YFV2SCA0024B4	Mounting Plate
M6	* YFV4JA0043A4	Support Spring
M7	* YFV5MA0007B4	Mounting Shoe for EVF
M8	* YFV6FA0019B3	Mounting Bracket for Shoe
M9	* YFV1FA0004A4	Mounting Nut for Shoe
M10	*YFV9AA0142AN	EVF Connector Cover Assy
M11	* YFV3CA0026A4	Mounting Base for Microphone
M12	* YFV2KB0052A4	Rear Chassis
M13	* YFV2TA0031A4	Shoulder Belt Mounting Bracket
M14	*YFV9AA0140AN	Right Side Cover Assy for WVP-200E
	*YFV9AA0143AN	Rigth Side Cover Assy for WVP-200N
M15	*YFV9AA0141AN	Left Side Cover Assy for WVP-200E
	*YFV9AA0144AN	Left Side Cover Assy for WVP-200N
M16	*YFV5EC0118A3	Left Bottom Cover
M18	*YFV5EB0117A3	CC/WB Cover
M19 ⚠	*YFV7MA0064AS	Bottom Cover Assy
M20	*YFV9AA0123AN	Shoulder Pad Assy
M21	*YFV5EB0115A3	Front Cover
M22	* YF701309	Body Mounting
M23	* YF501050	Mounting Spring
M24	* YF701301	Lens Base Assy
M25	* YF701354	Diffusion Filter Assy
M26	* YF701355	C/C Filter Assy
M27	* YF701310	Earth Spring (x2)
M28	* YF701304	Filter Mounting Screws (x2)
M29	* YF701311	Flik Spring (x2)
M30	* YF701312	Flik Ball
M31	* YF701501	Lock Knob
M32	* YF700005	Lock Spring
M35	* YFV3CA0022A4	Coil Holder A
M38	* YFV4JA0040B4	Wave Washer
M39	* YFV1KA0012A4	Round Plain Washer
M40	* YFV3FA0012A4	Backfocus Adjusting Ring
M41	* YFV2KA0051B1	Optical Coil Chassis
M42	* YFV2HA0080A4	Shield Case for Preamplifier
M43	* YFV2HA0081B4	Coil Holder Shield Plate
M44	* YFV2CA0027A4	Preamplifier Board Holder Shield Plate
M45	* YFV2HA0082A4	Bias Light Shield Plate A
M46	* YFV2HA0083A4	Bias Light Shield Plate B
M47	* YFV3CA0023A4	Coil Holder B
M48	* YFV2HA0095B4 *	Shield Cover A for Micro Processor Board
M49	* YFV2HA0100A4	Shield Cover B for Process Board
M50	* YFV2HA0098C4	Shield Cover C for EXT Mic Jack
M51	* YFV2EA0014A3	Hinge A (x3)
M52	* YFV2EA0015A3	Hinge B
M53	* YFV2HA0099B4	Shield Cover D for Audio/Lens Control Board
M55 ⚠	YFV7SC0079A4	Main Label for WVP-200E
⚠	YFV7SD0079A4	Main Label for WVP-200N
⚠	YFV7SH0079A4	Main Label for WVP-200E/B
M57	* YVZC700RB50	Serial No. Label
M62	* YFV2HA0087A4	Shield Cover A for Deflection Board
M63	* YFV2HA0088A4	Shield Cover B for Deflection Board
M66	*YFV2HA0117A4	Insulator Shield Plate

YFVPKA2002EA
PREAMPLIFIER BOARD

SYMBOL NO.	PART NO.	DESCRIPTION	
PCB001	*YFVPKA2002EA	Printed Circuit Board Assembly	
Q1	2SK316-PQ	Transistor	
Q2	2SA1022-CD	Transistor	
Q3	2SC2404-CD	Transistor	
Q4	2SA1022-CD	Transistor	
Q5	2SD601-QRS	Transistor	
D1	MA165	Diode	
R1	ERJ8GCSK565	Carbon	5.6M ohms 1/8W
R2	ER050CKG2704	Metal	2.7M ohms 1/2W
R3	ERJ8GCSJ431	Carbon	430 ohms 1/8W
R4	ERJ8GCSJ151	Carbon	150 ohms 1/8W
R5	ERJ8GCSJ304	Carbon	300K ohms 1/8W
R6	ERJ8GCSJ622	Carbon	6.2K ohms 1/8W
R7	ERJ8GCSG152	Carbon	1.5K ohms 1/8W
R8	ERJ8GCSJ183	Carbon	18K ohms 1/8W
R9	ERJ8GCSG132	Carbon	1.3K ohms 1/8W
R10	ERJ8GCSG151	Carbon	150 ohms 1/8W
R11	ERJ8GCSJ273	Carbon	27K ohms 1/8W
R12	ERJ8GCSJ134	Carbon	130K ohms 1/8W
R13	ERJ8GCSG241	Carbon	240 ohms 1/8W
R14	ERJ8GCSG122	Carbon	1.2K ohms 1/8W
R15	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W
R17	ERJ8GCSJ224	Carbon	220K ohms 1/8W
C1	YF426H273XKS	Ceramic	0.027 uF 50V
C2	ECEA25Z4R7	Electrolytic	4.7 µF 25V
C3	ECEA1AF470	Electrolytic	47 µF 10V
C5,6	ECEA25Z3R3	Electrolytic	3.3 µF 25V
C8	YF426010SLDS	Ceramic	1 pF 50V

SYMBOL NO.	PART NO.	DESCRIPTION	
C9	ECEA1ESS4R7	Electrolytic	4.7 µF 25V
C10	YF426H273XKS	Ceramic	0.027 µF 50V
C11	ECEA1AF470	Electrolytic	47 µF 10V
CT1	CTC6U030	Trimmer Capacitor	30 pF
L1	YFL270	Coil	270 µH
L2	YWL58R2J	Coil	8.2 µH
J1-3	ERJ8GCSJ0R00	Jumper Resistor	
BI1	EMCZ0311B01V	4 pin Connecting Wire Assy for CN4 (Process)	
M60	YFV1KA0002A4	Mounting Spacer	

YFVPKA2001EA
DEFLECTION BOARD

SYMBOL NO.	PART NO.	DESCRIPTION	
PCB002	* YFVPKA2001EA	Printed Circuit Board Assembly	
IC1	NJM2048MC	IC	
IC2,3	NJM3415M	IC	
IC4	NJM2903M	IC	
IC5	AN2510S	IC	
Q1	2SB837-CD	Transistor	
Q2	2SD601-QRS	Transistor	
Q3-5	2SB709-QRS	Transistor	
Q6	2SD601-QRS	Transistor	
Q7	2SD973-QRS	Transistor	
Q8,9	2SB710-QRS	Transistor	
Q11	2SD1030RST	Transistor	
Q12	2SC2404-CD	Transistor	
Q13	2SD1030-T	Transistor	
Q14	2SD601-QRS	Transistor	
Q15	2SD602-QRS	Transistor	
Q16	2SD1083	Transistor	
Q17	2SC2405STU	Transistor	
Q18	2SD814-QRS	Transistor	
Q19,20	2SB814-QRS	Transistor	
Q21	2SD601-QRS	Transistor	
Q22	2SB814-QRS	Transistor	
Q24	2SB709-QRS	Transistor	
Q25	2SD601-QRS	Transistor	
Q26	2SD602-QRS	Transistor	
Q27	2SD1083	Transistor	
Q29	2SB793-RS	Transistor	
Q40	2SD1030RST	Transistor	
D1	EK14	Diode	
D2	HZ3BLL	Diode	
D3	MA151K	Diode	
D4	MA165	Diode	
D5	MA151K	Diode	
D6	MA165	Diode	
D8	MA153	Diode	
R1	ERJ8GCSJ682	Carbon	6.8K ohms 1/8W
R2	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R3	ERJ8GCSG332	Carbon	3.3K ohms 1/8W
R5	ERJ8GCSG303	Carbon	30K ohms 1/8W
R6	ERJ8GCSJ912	Carbon	9.1K ohms 1/8W
R7	ERJ8GCSG222	Carbon	2.2K ohms 1/8W
R8	ERJ8GCSJ224	Carbon	220K ohms 1/8W
R9	ERJ8GCSJ561	Carbon	560 ohms 1/8W
R10	ERJ8GCSJ332	Carbon	3.3K ohms 1/8W
R11	ER010CKF3901	Metal	3.9K ohms 1/8W
R12	ER010CKF5601	Metal	5.6K ohms 1/8W
R13	ERJ8GCSJ203	Carbon	20K ohms 1/8W
R14	ERJ8GCSG912	Carbon	9.1K ohms 1/8W
R15	ERJ8GCSG113	Carbon	11K ohms 1/8W
R16	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R18	ERJ8GCSK225	Carbon	2.2M ohms 1/8W
R19	ERJ8GCSJ154	Carbon	150K ohms 1/8W
R20	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R21	ERJ8GCSJ391	Carbon	390 ohms 1/8W
R22	ERJ8GCSG303	Carbon	30K ohms 1/8W
R23	ERJ8GCSG512	Carbon	5.1K ohms 1/8W
R24	ERJ8GCSJ224	Carbon	220K ohms 1/8W
R25	ERJ8GCSJ563	Carbon	56K ohms 1/8W
R26,27	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R28	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R29	ERJ8GCSJ561	Carbon	560 ohms 1/8W
R30	ERJ8GCSJ221	Carbon	220 ohms 1/8W
R31	ER010CKF18R0	Metal	18 ohms 1/8W
R32	ERJ8GCSJ161	Carbon	160 ohms 1/8W
R33	ERJ8GCSJ181	Carbon	180 ohms 1/8W
R34	ERJ8GCSJ182	Carbon	1.8K ohms 1/8W
R35	ERSA39J332	Solid	3.3K ohms 1/8W
R36	ERJ8GCSJ274	Carbon	270K ohms 1/8W
R37	ERJ8GCSJ221	Carbon	220 ohms 1/8W
R38	ERJ8GCSJ333	Carbon	33K ohms 1/8W
R39	ERJ8GCSJ153	Carbon	15K ohms 1/8W
R40	ER0S2TKF5103	Metal	510K ohms 1/8W
R41	ERJ8GCSJ391	Carbon	390 ohms 1/8W
R42	ERJ8GCSJ302	Carbon	3K ohms 1/8W
R43	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R44	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R45	ER010CKF33R0	Metal	33 ohms 1/8W
R46	ERJ8GCSJ512	Carbon	5.1K ohms 1/8W
R47	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R48	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R49	ERJ8GCSJ333	Carbon	33K ohms 1/8W
R50	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R51	ERJ8GCSJ332	Carbon	3.3K ohms 1/8W
R52	ERJ8GCSJ153	Carbon	15K ohms 1/8W
R53	ERJ8GCSJ823	Carbon	82K ohms 1/8W
R55	ERJ8GCSJ273	Carbon	27K ohms 1/8W
R56	ERJ8GCSJ333	Carbon	33K ohms 1/8W
R57	ERJ8GCSJ184	Carbon	180K ohms 1/8W
R58,59	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R60	ERJ8GCSJ682	Carbon	6.8K ohms 1/8W
R61	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R62	ERJ8GCSJ823	Carbon	82K ohms 1/8W
R63	ERJ8GCSJ624	Carbon	620K ohms 1/8W
R64	ERJ8GCSJ153	Carbon	15K ohms 1/8W
R65	ERJ8GCSJ683	Carbon	68K ohms 1/8W
R66	ERJ8GCSJ104	Carbon	100K ohms 1/8W
R67	ERJ8GCSJ330	Carbon	33 ohms 1/8W
R68	ERJ8GCSJ151	Carbon	150 ohms 1/8W

SYMBOL NO.	PART NO.	DESCRIPTION		SYMBOL NO.	PART NO.	DESCRIPTION	
R69	ERJ8GCSJ332	Carbon	3.3K ohms 1/8W	C20	ECQP1301JZ	Plastic	300 pF 100V
R71	ERD10TJ3R3	Carbon	3.3 ohms 1/8W				
				C21	YF426561SLJS	Ceramic	560 pF 50V
R72	ERJ8GCSJ560	Carbon	56 ohms 1/8W	C22	ECEA1ASS470	Electrolytic	47 µF 10V
R73	ERJ8GCSJ102	Carbon	1K ohms 1/8W	C23	ECQK1104JG	Plastic	0.1 µF 100V
R74	ERJ8GCSJ512	Carbon	5.1K ohms 1/8W	C24	YF426473XMS	Ceramic	0.047 µF 50V
R75	ERJ8GCSJ623	Carbon	62K ohms 1/8W	C25	YF426102XMS	Ceramic	1000 pF 50V
R76	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W				
				C26	ECEA1ASS470	Electrolytic	47 µF 10V
R77	ERJ8GCSJ561	Carbon	560 ohms 1/8W	C27	ECEA1ESS4R7	Electrolytic	4.7 µF 25V
R79	ERJ8GCSJ334	Carbon	330K ohms 1/8W	C28	YF426272XMS	Ceramic	2700 pF 50V
R80	ERJ8GCSG512	Carbon	5.1K ohms 1/8W	C29	YF426473XMS	Ceramic	0.047 µF 50V
R81	ERJ8GCSJ102	Carbon	1K ohms 1/8W	C30	ECEA1ASS470	Electrolytic	47 µF 10V
R82	ERJ8GCSJ333	Carbon	33K ohms 1/8W				
				C31	ECEA2AS010	Electrolytic	1 µF 100V
R83	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W	C33	ECEA0JSS221	Electrolytic	220 µF 6.3V
R84	ERJ8GCSJ820	Carbon	82 ohms 1/8W	C34	ECEA1ASS470	Electrolytic	47 µF 10V
R85	ERJ8GCSJ151	Carbon	150 ohms 1/8W	C35	ECEA1AF470	Electrolytic	47 µF 10V
R90	ERJ8GCSJ105	Carbon	1M ohms 1/8W	C36	ECQV05824JZ	Plastic	0.82 µF 50V
R91	ERJ8GCSK225	Carbon	2.2M ohms 1/8W				
				C37	ECQP1152JZ	Plastic	1500 pF 100V
R96	ERJ8GCSJ150	Carbon	15 ohms 1/8W	C38	ECEA1CSS100	Electrolytic	10 µF 16V
R100	ERJ8GCSJ472	Carbon	4.7K ohms 1/8W	C39	YF426223XKS	Ceramic	0.022 µF 50V
R101	ERJ8GCSK225	Carbon	2.2M ohms 1/8W	C40	ECQM1H224KZ	Plastic	0.22 µF 50V
R103	ERJ8GCSJ682	Carbon	6.8K ohms 1/8W	C41	YF426102XMS	Ceramic	1000 pF 50V
R104	ERJ8GCSJ2R2	Carbon	2.2 ohms 1/8W				
				C42	YF426911CHJS	Ceramic	910 pF 50V
R105	ERDS1TJ360	Carbon	36 ohms 1/4W	C43	ECEA1ESS4R7	Electrolytic	4.7 µF 25V
R106	ERD25FJ150	Carbon	150 ohms 1/4W	C44	ECEA1ASS470	Electrolytic	47 µF 10V
VR1	YWH0651A33K	Variable Resistor	33K ohms	C45	ECEA1ASS221	Electrolytic	220 µF 10V
VR2	YWH0621A100	Variable Resistor	100 ohms	C46	ECQP1432JZ	Plastic	4300 pF 100V
VR3	YFH0521A10K	Variable Resistor	10K ohms				
				C47	ECEA2AS3R3	Electrolytic	3.3 µF 100V
VR4	YWH0651A1R5K	Variable Resistor	1.5K ohms	C48	ECEA2CS010	Electrolytic	1 µF 160V
VR5	YFH0621A150K	Variable Resistor	150K ohms	C50	DE979B152K	Ceramic	1500 pF 50V
VR6	YWH0651A4R7K	Variable Resistor	4.7K ohms	C51	ECQE2473KS	Plastic	0.047 µF 250V
VR7	YFH0521A47K	Variable Resistor	47K ohms	C52	ECEA1AF470	Electrolytic	47 µF 10V
VR8,9	YWH0651A47K	Variable Resistor	47K ohms				
				C53	ECQE2473KS	Plastic	0.047 µF 250V
VR10	YFH0521A47K	Variable Resistor	47K ohms	C54	YF426272XMS	Ceramic	2700 pF 50V
VR11	YFH0521A100	Variable Resistor	100 ohms	C57	YF426473XMS	Ceramic	0.047 µF 50V
VR12	YWH0651A4R7K	Variable Resistor	4.7K ohms	C60	ECEA1CN100S	Electrolytic	10 µF 16V
VR13	YWH0651A10K	Variable Resistor	10K ohms	C61	ECEA1HN010S	Electrolytic	1 µF 50V
VR14	YFH0521A1M	Variable Resistor	1M ohms				
				C300	ECEA2AS010	Electrolytic	1 µF 100V
Z1	ECM78GA0015	Block Variable Resistor		L1	YFPC470K	Coil	47 µH
C1	ECEA1AF470	Electrolytic	47 µF 10V	L2	YFPF331K	Coil	330 µH
C2	ECEA1ES100	Electrolytic	10 µF 25V	L3	YFPC470K	Coil	47 µH
C3	YF426102XMS	Ceramic	1000pF 50V	L4	YFLH103JZ	Coil	10 MH
C5	ECEA1EF330	Electrolytic	33 µF 25V				
				VL5	YFVL303	Coil	30 MH
C6	ECEA1AS221	Electrolytic	220 µF 10V	L6	YFVC101J	Coil	100 µH
C7	YF426331CHJS	Ceramic	330 pF 50V	T1	ECXC0200	Flyback Transformer	
C8	ECEA1ASS470	Electrolytic	47 µF 10V	T2	YFVL801	Flyback Transformer	
C9	ECEA1AF101	Electrolytic	100 µF 10V	F1 ⚠	ICPF25	Current Fuse	
C10	ECEA0JSS101	Electrolytic	100 µF 6.3V				
				CN1-JM	EMCS0650Z	6 pin Jack Male	
C11	ECEA1ASS470	Electrolytic	47 µF 10V	CN2-JM	EMCS0850Z	8 pin Jack Male	
C12	ECEA1ESS4R7	Electrolytic	4.7 µF 25V	CN3-JM	EMCS0550Z	5 pin Jack Male	
C13	ECEA1HSS2R2	Electrolytic	2.2 µF 50V	CN4,5-JM	EMCS0250Z	2 pin Jack Male	
C14	YF426473XMS	Ceramic	0.047 µF 50V	CN6-JM	EMCS1050Z	10 pin Jack Male	
C15	ECKF1H102KB	Ceramic	1000 pF 50V				
				CN7-JM	EMCS0550Z	5 pin Jack Male	
C16	ECEA1ASS470	Electrolytic	47 µF 10V	CN8-JM	EMCS0250Z	2 pin Jack Male	
C17	ECEA1ASS470	Electrolytic	47 µF 10V	BI1	YFSB461501	Socket	
C18	ECEA1AF101	Electrolytic	100 µF 10V	M61	YFV2HA0086A4	Shield Case	
C19	ECQM1H124KZ	Plastic	0.12 µF 50V				

SYMBOL NO.	PART NO.	DESCRIPTION	
YFVPKA2003EA PROCESS BOARD			
PCB003	* YFVPKA2003EA	Printed Circuit Board Assembly	
IC1	AN2560S	IC	
IC2	AN2110S	IC	
IC3	AN2310S	IC	
IC4	AN2320S	IC	
IC5	AN6914S	IC	
IC6	*YFH4151KIT	IC for IC6, L101 and V101	
IC7	NJM3414M	IC	
IC8	AN2210SA	IC	
IC9	MN8037	IC	
IC10	AN2410S	IC	
IC11	MN6160PBS	IC	
IC12	YFEHMB09H85	IC	
IC13	MT0001	IC	
Q1	2SB709-QRS	Transistor	
Q2	2SC2404-CD	Transistor	
Q3-6	2SD601-QRS	Transistor	
Q7	2SD602-QRS	Transistor	
Q8-10	2SB709-QRS	Transistor	
Q11	2SD601-QRS	Transistor	
Q12	2SB709-QRS	Transistor	
Q13,14	2SD601-QRS	Transistor	
Q15	2SB709-QRS	Transistor	
Q17,18	2SD601-QRS	Transistor	
Q21	2SD601-QRS	Transistor	
Q30	2SB709-QRS	Transistor	
Q31	2SC2404-CD	Transistor	
Q32	2SD601-QRS	Transistor	
Q33-35	2SC2404-CD	Transistor	
D1-7	MA151K	Diode	
D9,10	MA151K	Diode	
D11,12	YUD1S2688	Diode	
D13	MA151K	Diode	
D14	MA165	Diode	
R1	ERJ8GCSG273	Carbon	27K ohms 1/8W
R2	ERJ8GCSG333	Carbon	33K ohms 1/8W
R3	ERJ8GCSJ303	Carbon	30K ohms 1/8W
R4	ERJ8GCSJ123	Carbon	12K ohms 1/8W
R5	ERJ8GCSJ682	Carbon	6.8K ohms 1/8W
R6	ERJ8GCSJ473	Carbon	47K ohms 1/8W
R7	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R9	ERJ8GCSJ123	Carbon	12K ohms 1/8W
R10	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R11	ERJ8GCSJ561	Carbon	560 ohms 1/8W
R12	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R13	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R14	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R15	ERJ8GCSJ471	Carbon	470 ohms 1/8W
R17	ERJ8GCSJ123	Carbon	12K ohms 1/8W
R18,19	ERJ8GCSJ332	Carbon	3.3K ohms 1/8W
R21	ERJ8GCSJ392	Carbon	3.9K ohms 1/8W
R22	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R23	ERJ8GCSJ393	Carbon	39K ohms 1/8W
R24	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R25	ERJ8GCSJ184	Carbon	180K ohms 1/8W
R26	ERJ8GCSJ563	Carbon	56K ohms 1/8W
R27	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R28	ERJ8GCSJ471	Carbon	470 ohms 1/8W
R29	ERJ8GCSJ273	Carbon	27K ohms 1/8W
R30	ERJ8GCSJ563	Carbon	56K ohms 1/8W
R31,32	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R33	ERJ8GCSJ183	Carbon	18K ohms 1/8W
R34	ERJ8GCSG821	Carbon	820 ohms 1/8W
R35	ERJ8GCSG512	Carbon	5.1K ohms 1/8W
R36	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R37	ERJ8GCSJ563	Carbon	56K ohms 1/8W
R38	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R39	ERJ8GCSJ123	Carbon	12K ohms 1/8W
R40	ERJ8GCSJ185	Carbon	1.8M ohms 1/8W
R41	ERJ8GCSJ473	Carbon	47K ohms 1/8W
R42	ERJ8GCSJ154	Carbon	150K ohms 1/8W
R43	ERJ8GCSJ683	Carbon	68K ohms 1/8W
R44	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R46	ERJ8GCSJ124	Carbon	120K ohms 1/8W
R47	ERJ8GCSJ153	Carbon	15K ohms 1/8W
R48	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R49,50	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R51	ERJ8GCSJ153	Carbon	15K ohms 1/8W
R52	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R53	ERJ8GCSJ431	Carbon	430 ohms 1/8W
R54	ERJ8GCSJ561	Carbon	560 ohms 1/8W
R55	ERJ8GCSJ274	Carbon	270K ohms 1/8W
R56	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R57	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R59	ERJ8GCSJ152	Carbon	1.5K ohms 1/8W
R63,64	ERJ8GCSJ333	Carbon	33K ohms 1/8W
R65	ERJ8GCSJ304	Carbon	300K ohms 1/8W
R66	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R70	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R71	ERJ8GCSJ823	Carbon	82K ohms 1/8W
R72	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R73	ERJ8GCSJ472	Carbon	4.7K ohms 1/8W
R74	ERJ8GCSJ185	Carbon	1.8M ohms 1/8W
R75	ERJ8GCSJ563	Carbon	56K ohms 1/8W
R76	ERJ8GCSJ682	Carbon	6.8K ohms 1/8W
R77	ERJ8GCSJ393	Carbon	39K ohms 1/8W
R78	ERJ8GCSJ394	Carbon	390K ohms 1/8W
R79	ERJ8GCSJ334	Carbon	330K ohms 1/8W
R80	ERJ8GCSJ273	Carbon	27K ohms 1/8W
R81	ERJ8GCSK565	Carbon	5.6M ohms 1/8W
R82	ERJ8GCSJ155	Carbon	1500K ohms 1/8W
R83,84	ERJ8GCSJ473	Carbon	47K ohms 1/8W
R85,86	ERJ8GCSJ244	Carbon	240K ohms 1/8W
R87	ERJ8GCSJ184	Carbon	180K ohms 1/8W
R88	ERJ8GCSJ244	Carbon	240K ohms 1/8W
R89	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R90	ERJ8GCSJ224	Carbon	220K ohms 1/8W
R91	ERJ8GCSJ164	Carbon	160K ohms 1/8W
R92	ERJ8GCSJ224	Carbon	220K ohms 1/8W
R93	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R94	ERJ8GCSG752	Carbon	7.5K ohms 1/8W
R95	ERJ8GCSG243	Carbon	24K ohms 1/8W
R96	ERJ8GCSG182	Carbon	1.8K ohms 1/8W

SYM-BOL NO.	PART NO.	DESCRIPTION	
R97	ERJ8GCSG682	Carbon	6.8K ohms 1/8W
R98,99	ERJ8GCSJ333	Carbon	33K ohms 1/8W
R100	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R101	ERJ8GCSJ681	Carbon	680 ohms 1/8W
R102	ERJ8GCSJ221	Carbon	220 ohms 1/8W
R103	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W
R104	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R105	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R106	ERJ8GCSJ152	Carbon	1.5K ohms 1/8W
R107	ERJ8GCSJ561	Carbon	560 ohms 1/8W
R108	ERJ8GCSJ472	Carbon	4.7K ohms 1/8W
R109	ERJ8GCSJ153	Carbon	15K ohms 1/8W
R110	ERJ8GCSJ104	Carbon	100K ohms 1/8W
R111	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R112	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R113	ERJ8GCSJ683	Carbon	68K ohms 1/8W
R114	ERJ8GCSJ183	Carbon	18K ohms 1/8W
R115	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W
R116	ERJ8GCSJ751	Carbon	750 ohms 1/8W
R117	ERJ8GCSJ684	Carbon	680K ohms 1/8W
R118	ERJ8GCSJ331	Carbon	330 ohms 1/8W
R119	ERJ8GCSJ561	Carbon	560 ohms 1/8W
R120	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R121	ERJ8GCSJ123	Carbon	12K ohms 1/8W
R122	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R127	ERJ8GCSJ393	Carbon	39K ohms 1/8W
R129	ERJ8GCSJ273	Carbon	27K ohms 1/8W
R130	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R131	ERJ8GCSJ680	Carbon	68 ohms 1/8W
R132	ERJ8GCSJ683	Carbon	68K ohms 1/8W
R133	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R134,135	ERJ8GCSJ471	Carbon	470 ohms 1/8W
R136	ERJ8GCSJ183	Carbon	18K ohms 1/8W
R137	ERJ8GCSJ563	Carbon	56K ohms 1/8W
R138	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R139	ERJ8GCSJ392	Carbon	3.9K ohms 1/8W
R140	ERJ8GCSJ472	Carbon	4.7K ohms 1/8W
R148	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R149	ERJ8GCSJ182	Carbon	1.8K ohms 1/8W
R150	ERJ8GCSJ822	Carbon	8.2K ohms 1/8W
R151	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R152	ERJ8GCSJ152	Carbon	1.5K ohms 1/8W
R153	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R154	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R155	ERJ8GCSJ273	Carbon	27K ohms 1/8W
R156	ERJ8GCSJ392	Carbon	3.9K ohms 1/8W
R157	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R162	ERJ8GCSJ221	Carbon	220 ohms 1/8W
R163	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R164	ERJ8GCSJ150	Carbon	15 ohms 1/8W
R165	ERJ8GCSJ122	Carbon	1.2K ohms 1/8W
R166	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R170	ERJ8GCSJ334	Carbon	330K ohms 1/8W
R198	ERJ8GCSJ271	Carbon	270 ohms 1/8W
R207	ERJ8GCSJ303	Carbon	30K ohms 1/8W
R208	ERJ8GCSJ153	Carbon	15K ohms 1/8W
R209	ERJ8GCSJ392	Carbon	3.9K ohms 1/8W
R210	ERJ8GCSJ333	Carbon	33K ohms 1/8W
R211,212	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R213	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R218	ERJ8GCSJ683	Carbon	68K ohms 1/8W
R220	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R222	ERJ8GCSJ683	Carbon	68K ohms 1/8W
R223	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R224	ERJ8GCSJ224	Carbon	220K ohms 1/8W
R225	ERJ8GCSJ392	Carbon	3.9K ohms 1/8W
R226	ERJ8GCSJ123	Carbon	12K ohms 1/8W
R227	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R228	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R229	ERJ8GCSJ202	Carbon	2K ohms 1/8W
R230	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R231	ERJ8GCSJ681	Carbon	680 ohms 1/8W
R232	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R233	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W
R234	ERJ8GCSJ154	Carbon	150K ohms 1/8W
R235	ERJ8GCSJ164	Carbon	160K ohms 1/8W
R240	ERJ8GCSJ272	Carbon	2.7K ohms 1/8W
R242,243	ERJ8GCSG752	Carbon	7.5K ohms 1/8W
R244	ERJ8GCSJ472	Carbon	4.7K ohms 1/8W
R245	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W
R246	ERJ8GCSJ104	Carbon	100K ohms 1/8W
R247	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W
R252	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R253	ERJ8GCSJ103	Carbon	10K ohms 1/8W
VR1	YWH0651A22K	Variable Resistor	22K ohms
VR2,3	YWH0651A10K	Variable Resistor	10K ohms
VR4	YWH0651A3R3K	Variable Resistor	3.3K ohms
VR5	YWH0651A2R2K	Variable Resistor	2.2K ohms
VR12	YWH0651A10K	Variable Resistor	10K ohms
VR13	YWH0651A470	Variable Resistor	470 ohms
VR14	YFH0621A680X	Variable Resistor	680 ohms
VR15	YFH0521A1K	Variable Resistor	1K ohms
VR16	YFH0521A10K	Variable Resistor	10K ohms
VR18	YWH0651A3R3K	Variable Resistor	3.3K ohms
VR20	YFH0521A47K	Variable Resistor	47K ohms
VR21,22	YFH0521A2R2K	Variable Resistor	2.2K ohms
VR23	YFH0521A6R8K	Variable Resistor	6.8K ohms
BVR1,2	YFH1622A001	Block Variable Resistor	
Z1	EXBD87321JW	Block Resistor	
Z2	EXBD85322S	Block Resistor	
Z3	EXBF5L324J	Block Resistor	
Z4	EXBF6L323J	Block Resistor	
C1	ECSF1AE476	Electrolytic	47 μF 10V
C2,3	YF426681SLKS	Ceramic	680 pF 50V
C4	ECEA1ASS330	Electrolytic	33 μF 10V
C5	ECEA10Z47	Electrolytic	47 μF 10V
C6	YF426270CHJS	Ceramic	27 pF 50V
C7	YF426681SLKS	Ceramic	680 pF 50V
C9	YF426104DMS	Ceramic	0.1 μF 50V
C10	ECEA1ASS220	Electrolytic	22 μF 10V
C11	ECEA1ASS470	Electrolytic	47 μF 10V
C12	ECEA1ASS470	Electrolytic	47 μF 10V
C13	YF426330CHJS	Ceramic	33 pF 50V

SYMBOL NO.	PART NO.	DESCRIPTION	
C14	ECEA1ASS470	Electrolytic	47 µF 10V
C15	ECEA1HSS010	Electrolytic	1 µF 50V
C16	YF426473XMS	Ceramic	0.047 µF 50V
C17	ECEA1VSS4R7	Electrolytic	4.7 µF 35V
C18	ECEA1CSS100	Electrolytic	10 µF 16V
C19	ECEA1ASS470	Electrolytic	47 µF 10V
C20	ECEA1ASS220	Electrolytic	22 µF 10V
C21,22	ECEA1ASS470	Electrolytic	47 µF 10V
C23,24	YF426473XMS	Ceramic	0.047 µF 50V
C25	YF426330CHJS	Ceramic	33 pF 50V
C26	ECEA1ASS470	Electrolytic	47 µF 10V
C27	YF426222XMS	Ceramic	2200 pF 50V
C28	YF426330CHJS	Ceramic	33 pF 50V
C29	ECEA1ASS470	Electrolytic	47 µF 10V
C30	ECEA1HSS3R3	Electrolytic	3.3 µF 50V
C31,32	ECEA1HSS3R3	Electrolytic	3.3 µF 50V
C33	ECEA1AK470	Electrolytic	47 µF 10V
C34-36	YF426104DMS	Ceramic	0.1 µF 50V
C38	YF426221SLKS	Ceramic	220 pF 50V
C39	YF426473XMS	Ceramic	0.047 µF 50V
C40,41	YF426221SLKS	Ceramic	220 pF 50V
C42	YF426473XMS	Ceramic	0.047 µF 50V
C43	YF426471SLKS	Ceramic	470 pF 50V
C44	ECEA1AK470	Electrolytic	47 µF 10V
C45	YF426470SLKS	Ceramic	47 pF 50V
C46	ECEA1HSS010	Electrolytic	1 µF 50V
C47	YF426473XMS	Ceramic	0.047 µF 50V
C48	YF426104DMS	Ceramic	0.01µF 50V
C49	YF426473XMS	Ceramic	0.047 µF 50V
C50	YF426681SLKS	Ceramic	680 pF 50V
C51	ECEA1ASS220	Electrolytic	22 µF 10V
C52	YF426121CHJS	Ceramic	120 pF 50V
C53	YF426222XKS	Ceramic	2200 pF 50V
C54	ECEA0JSS471	Electrolytic	470 µF 6.3V
C55	ECEA1ASS470	Electrolytic	47 µF 10V
C56	YF426680CHJS	Ceramic	68 pF 50V
C57	ECEA1ASS470	Electrolytic	47 µF 10V
C58	YF426222XMS	Ceramic	2200 pF 50V
C59	ECEA1CSS100	Electrolytic	10 µF 16V
C60,61	YF426473XMS	Ceramic	0.047 µF 50V
C66	YF426473XMS	Ceramic	0.047 µF 50V
C67	ECEA1ASS470	Electrolytic	47 µF 10V
C69,70	YF426222XMS	Ceramic	2200 pF 50V
C71	ECEA1ASS470	Electrolytic	47 µF 10V
C72	ECEA1ASS470	Electrolytic	47 µF 10V
C73	YF426681SLKS	Ceramic	680 pF 50V
C74	YF426473XMS	Ceramic	0.047 µF 50V
C75	YF426681SLKS	Ceramic	680 pF 50V
C86	YF426221SLKS	Ceramic	220 pF 50V
C90	YF426221SLKS	Ceramic	220 pF 50V
C91	ECEA1ASS470	Electrolytic	47 µF 10V
C92	YF426473XMS	Ceramic	0.047 µF 50V
C93	YF426470SLKS	Ceramic	47 pF 50V
C94	YF426181SLJS	Ceramic	180 pF 50V
C96,97	YF426102XMS	Ceramic	1000 pF 50V
C100	ECEA1HSSR47	Electrolytic	0.47 µF 50V

SYMBOL NO.	PART NO.	DESCRIPTION	
C101	YF426472XMS	Ceramic	4700 pF 50V
C102	YF426181SLJS	Ceramic	180 pF 50V
C103	YF426102XMS	Ceramic	1000 pF 50V
C104	ECEA1ASS470	Electrolytic	47 µF 10V
C105	YF426681SLKS	Ceramic	680 pF 50V
C106	YF426220SLKS	Ceramic	22 pF 50V
C107	YF426221SLKS	Ceramic	220 pF 50V
C108,109	YF426120CHJT	Ceramic	12 pF 50V
C110	ECEA1ASS470	Electrolytic	47 µF 10V
C111	YF426102XMS	Ceramic	1000 pF 50V
C112	YF426104DMS	Ceramic	0.1 µF 50V
C113	YF426150CHJS	Ceramic	15 pF 50V
C114	YF426103XMS	Ceramic	0.01µF 50V
C115,116	YF426101CHJS	Ceramic	100 pF 50V
C117	YF426103XMS	Ceramic	0.01 µF 50V
C118	ECEA1HN010S	Electrolytic	1 µF 50V
C119	YF426151CHJS	Ceramic	150 pF 50V
C120	YF426471SLKS	Ceramic	470 pF 50V
C121	YF426473XMS	Ceramic	0.047 µF 50V
C122	YF426472XMS	Ceramic	4700 pF 50V
C123	ECSF1AE156	Electrolytic	10 µF 10V
C124	ECCF1H220JC	Ceramic	22 pF 50V
CT1	YFTZ03R300F	Trimmer Capacitor	30 pF
CT2	YFTZ03R300F	Trimmer Capacitor	30 pF
CT3	ECRHA070M11	Trimmer Capacitor	
CT4	YFTZ03R300F	Trimmer Capacitor	30 pF
CT5	YFTZ03R200F	Trimmer Capacitor	20 pF
DL1	YFCP1450AB51	Delay Line	
L1	YWL5181J	Coil	180 µH
L2	YFEL05SI8R2K	Coil	8.2 µH
L3,4	YWL5100J	Coil	10 µH
L5	YWL58R2J	Coil	8.2 µH
L6	YFEL05SI8R2K	Coil	8.2 µH
L7	YFL5151J	Coil	150 µH
L10	YFEL05SI8R2K	Coil	8.2 µH
L12	YWL5271J	Coil	270 µH
L13	EL05SI101K	Coil	100 µH
L14	YFEL05SI2R2K	Coil	2.2 µH
VL15	YFF051054	Coil	
SW1	YWSSS21200	Slide Switch	
X1	YFMS30917R7M	Crystal Oscillator	
CF1	YFELB5A011	Filter	
CF2	YFSLC871154	Filter	
CF3	YFSLC861102	Filter	
CF4	YFSLC841155	Filter	
CF5	YFSLC841195	Filter	
CF6	YFELB5A010	Filter	
CF7	YFSLC851151	Filter	
CF8	YFELB5A047	Filter	
CF10	YFSLC028	Filter	
CF11	YFSLC841156	Filter	
J1-9	ERJ8GCSJ0R00	Jumper Resistor	
CN1,2-JM	EMCS0350Z	3 pin Jack Male	
CN3-JM	EMCS0650Z	6 pin Jack Male	
CN4-JM	EMCS0350Z	3 pin Jack Male	
CN5-JM	EMCS0750Z	7 pin Jack Male	
CN6-JM	EMCS0550Z	5 pin Jack Male	
CN7	YF742J2546	6 pin Flat Cable for E3 (Deflection)	

SYM-BOL NO.	PART NO.	DESCRIPTION	
CN8	YF742J25410	10 pin Flat Cable for E2 (Deflection)	
CN9-JM	EMCS0250Z	2 pin Jack Male	
CN10	YFICS6412663	IC Socket	
CN11-JM	EMCS0250Z	2 pin Jack Male	
BI1	EMCZ0911D04V	9 pin Connecting Wire Assy for BI1 and CN6 (Micro Processor)	
BI2	EMCZ0711D01V	7 pin Connecting Wire Assy for BI2 and CN8 (Micro Processor)	
BI3	EMCZ1011D01V	10 pin Connecting Wire Assy for BI3 and CN7 (Micro Processor)	
M64	YFV2HA0105A3	Shield Cover	
M65	YFV2HA0106A4	Shield Case	

YFVPKA2004EA
MICROPROCESSOR BOARD

SYM-BOL NO.	PART NO.	DESCRIPTION	
PCB004	* YFVPKA2004EA	Printed Circuit Board Assembly	
IC1	MN1237B	IC	
IC2	MN1554CVB	IC	
IC3,4	AN90B82S	IC	
Q1	2SC2404-CD	Transistor	
Q2	2SB709-QRS	Transistor	
Q3-8	2SD601-QRS	Transistor	
Q9	2SB814-QRS	Transistor	
Q10	2SA1022-CD	Transistor	
Q11	2SC2404-CD	Transistor	
Q12	2SB709-QRS	Transistor	
Q13	2SD602-QRS	Transistor	
Q14	2SD601-QRS	Transistor	
Q15	2SB709-QRS	Transistor	
Q16	2SD601-QRS	Transistor	
Q17	2SB709-QRS	Transistor	
Q18,19	2SD601-QRS	Transistor	
Q20	2SB709-QRS	Transistor	
Q30	2SB709-QRS	Transistor	
Q31	2SD601-QRS	Transistor	
Q32	2SD1030RST	Transistor	
Q33,34	2SB709-QRS	Transistor	
Q35	2SD601-QRS	Transistor	
Q40	LA733K	Transistor	
D3-13	MA151K	Diode	
D16	MA151K	Diode	
R1	ERJ8GCSJ273	Carbon	27K ohms 1/8W
R2	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R3	ERJ8GCSJ274	Carbon	270K ohms 1/8W
R4	ERJ8GCSJ154	Carbon	150K ohms 1/8W
R5	ERJ8GCSJ104	Carbon	100K ohms 1/8W
R6	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W
R7	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R8	ERJ8GCSJ682	Carbon	6.8K ohms 1/8W
R9	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R10	ERJ8GCSJ473	Carbon	47K ohms 1/8W
R12	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R13	ERJ8GCSJ473	Carbon	47K ohms 1/8W
R14	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R15	ERJ8GCSJ473	Carbon	47K ohms 1/8W

SYM-BOL NO.	PART NO.	DESCRIPTION	
R16	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R17	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R18,19	ERJ8GCSJ153	Carbon	15K ohms 1/8W
R20	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R21	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R22	ERJ8GCSJ472	Carbon	4.7K ohms 1/8W
R23	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R24	ERJ8GCSK106	Carbon	10M ohms 1/8W
R25	ERJ8GCSJ474	Carbon	470K ohms 1/8W
R26	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R27	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R28	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R29	ERJ8GCSJ334	Carbon	330K ohms 1/8W
R30	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R31	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R32	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R33	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R34	ERJ8GCSJ331	Carbon	330 ohms 1/8W
R35-37	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R38	ERJ8GCSJ224	Carbon	220K ohms 1/8W
R40,41	ERJ8GCSJ473	Carbon	47K ohms 1/8W
R42-45	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R46	ERJ8GCSJ473	Carbon	47K ohms 1/8W
R47	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R48-51	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R52	ERJ8GCSJ473	Carbon	47K ohms 1/8W
R53	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R54	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R55	ERJ8GCSJ392	Carbon	3.9K ohms 1/8W
R60	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W
R61	ERJ8GCSJ563	Carbon	56K ohms 1/8W
R62	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R63	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R64	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R65	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R66	ERJ8GCSJ683	Carbon	68K ohms 1/8W
R67	ERJ8GCSJ104	Carbon	100K ohms 1/8W
R68	ERJ8GCSJ331	Carbon	330 ohms 1/8W
R69	ERJ8GCSJ101	Carbon	100 ohms 1/8W
R70	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R71	ERJ8GCSJ824	Carbon	820K ohms 1/8W
R72	ERD25FJ223	Carbon	22K ohms 1/4W
R75	ERD10TJ104	Carbon	100K ohms 1/8W
VR1	YFH0521A2R2K	Variable Resistor	2.2K ohms
Z1	EXBLD6154GU	Block Resistor	
Z2,3	EXBEQ6822J	Block Resistor	
Z4	EXBLD6154GU	Block Resistor	
Z5	EXBEQ8683J	Block Resistor	
C2	YF426390CHJS	Ceramic	39 pF 50V
C3	YF426470SLKS	Ceramic	47 pF 50V
C4	YF426221SLKS	Ceramic	220 pF 50V
C5	YF426470SLKS	Ceramic	47 pF 50V
C6	ECEA0JSS221	Electrolytic	220 µF 6.3V
C7	YF426104DMS	Ceramic	0.1 µF 50V
C8	YF426270CHJS	Ceramic	27 pF 50V
C9,10	YF426330CHJS	Ceramic	33 pF 50V
C11	ECEA0JSS470	Electrolytic	47 µF 6.3V

SYMBOL NO.	PART NO.	DESCRIPTION	
C12,13	ECEA1CSS100	Electrolytic	10 µF 16V
C14	ECEA1AF470	Electrolytic	47 µF 10V
C15	ECKF1H121KB	Ceramic	120 pF 50V
C16	ECKF1H471KB	Ceramic	470 pF 50V
C17	YF426271SLJS	Ceramic	270 pF 50V
C18	ECKF1H222MD	Ceramic	2200pF 50V
C20	ECSF1AE475	Electrolytic	4.7 µF 10V
C21	ECEA1CSS100	Electrolytic	10 µF 16V
C22	ECSF1AE475	Electrolytic	4.7 µF 10V
C23,24	ECSF1AE156	Electrolytic	15 µF 10V
CT1	CTC6S040	Trimmer Capacitor	40pF
L1	ELEMH101KA	Coil	100 µH
L2	ELEMH8R2KA	Coil	8.2 µH
X1	KF38J	Crystal Oscillator	
X2	KBR4R0M7	Crystal Oscillator	
J1	ERJ8GCSJ0R00	Jumper Resistor	
CN1	YF742J28	8 pin Connector for Flat Cable	
CN2	YFFH111SDSA	11 pin Connector for Flat Cable	
CN3	EMCS0350Z	3 pin Jack Male	
CN4,5	EMCS0250Z	2 pin Jack Male	
CN6	EMCS0950Z	9 pin Jack Male	
CN7	EMCS1050Z	10 pin Jack Male	
CN8	EMCS0750Z	7 pin Jack Male	
E1	EMCLZ807D91V	Internal Wire	
BI1	EMCZ1014D02V	10 pin Connecting Wire Assy for BI1 and CN6 (Deflection)	

YFVAKA0158AN
STANDBY BOARD

SYMBOL NO.	PART NO.	DESCRIPTION	
PCB006	* YFVAKA0158AN	Printed Circuit Board Assembly	
Q1	2SB793-QRS	Transistor	
Q2	2SD636-QRS	Transistor	
D1	MA165	Diode	
D2	YFLN11WP23F	LED	
R1	ERD10TJ272	Carbon	2.7K ohms 1/8W
R2	ERD10TJ103	Carbon	10K ohms 1/8W
R3	ERD10TJ332	Carbon	3.3K ohms 1/8W
R4	ERD10TJ2R7	Carbon	2.7 ohms 1/8W
R5	ERD10TJ681	Carbon	680 ohms 1/8W
R6	ERD10TJ223	Carbon	22K ohms 1/8W
R7	ERD10TJ241	Carbon	240 ohms 1/8W
R8	ERD10TJ161	Carbon	160 ohms 1/8W
R9	ERD10TJ271	Carbon	270 ohms 1/8W
R10	ERD10TJ563	Carbon	56K ohms 1/8W
VR1	EVJLCA307B34	Variable Resistor	30K ohms
VR2	EVJLCA307B14	Variable Resistor	10K ohms
SW2	YFSSY023L6N	Slide Switch	
BI1	EMCZ0510D02V	5 pin Connecting Wire Ass y for BI1 and CN6 (Process)	
BI2	EMCZ0614D02V	6 pin Connecting Wire Ass y for BI2 and CN1 (Deflection)	
M17	YFV5ED0119A3	Right Bottom Cover	
M67	YFV5RB0027A4	Standby Switch Knob	
M69	YFV5RA0038A4	Auto Iris/Balance Regulation Knob	

YFVPKA2005EA
AUDIO/LENS CONTROL BOARD

SYMBOL NO.	PART NO.	DESCRIPTION	
PCB007	* YFVPKA2005EA	Printed Circuit Board Assembly	
IC1	NJM3414M	IC	
IC2	NJM4558MD	IC	
IC3	NJM3415M	IC	
Q1-4	2SB709-QRS	Transistor	
Q5	2SC2405ST	Transistor	
Q6,7	2SC2405STU	Transistor	
Q8	2SB709-QRS	Transistor	
D1	MA151K	Diode	
D2	MA153	Diode	
D4,7	MA151K	Diode	
D8	MA151K	Diode	
R1	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R2	ERJ8GCSJ104	Carbon	100K ohms 1/8W
R3	ERJ8GCSJ154	Carbon	150K ohms 1/8W
R4	ERJ8GCSJ333	Carbon	33K ohms 1/8W
R5	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R6	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R7	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R8	ERJ8GCSG752	Carbon	7.5K ohms 1/8W
R9,10	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R11	ERJ8GCSG752	Carbon	7.5K ohms 1/8W
R14	ERJ8GCSJ470	Carbon	47 ohms 1/8W
R15	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R16	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R17	ERJ8GCSJ104	Carbon	100K ohms 1/8W
R18	ERJ8GCJ434V	Carbon	430K ohms 1/8W
R19	ERJ8GCSJ334	Carbon	330K ohms 1/8W
R20	ERJ8GCSJ152	Carbon	1.5K ohms 1/8W
R21	ERJ8GCSJ331	Carbon	330 ohms 1/8W
R22	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R23	ERJ8GCSJ334	Carbon	330K ohms 1/8W
R25	ERJ8GCSG182	Carbon	1.8K ohms 1/8W
R26	ERJ8GCSG102	Carbon	1K ohms 1/8W
R27	ERJ8GCSJ0R00	Jumper Resistor	
R29	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R30	ERJ8GCSK8R2	Carbon	8.2 ohms 1/8W
R31	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R32	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R33	ERJ8GCSJ152	Carbon	1.5K ohms 1/8W
R34	ERJ8GCSJ331	Carbon	330 ohms 1/8W
R35	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R36	ERJ8GCSJ334	Carbon	330K ohms 1/8W
R38	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R39	ERJ8GCSK8R2	Carbon	8.2 ohms 1/8W
R41	ERJ8GCSJ122	Carbon	1.2K ohms 1/8W
R42,43	ERJ8GCSJ0R00	Jumper Resistor	
R45	ERJ8GCSJ681	Carbon	680 ohms 1/8W
R47	ERJ8GCSJ822	Carbon	8.2K ohms 1/8W
C1	YF426104DMS	Ceramic	0.1 µF 50V
C2	YF426271SLJS	Ceramic	270 pF 50V
C3	ECEA1ASS470	Electrolytic	47 µF 10V
C4	YF426473XMS	Ceramic	0.047 µF 50V
C6	ECEA0JU101	Electrolytic	100 µF 6.3V
C7	ECQV1H393JZ	Plastic	0.039 µF 50V

SYMBOL NO.	PART NO.	DESCRIPTION	
C8	YF426103XMS	Ceramic	0.01 μF 50V
C9	ECEA1ASS470	Electrolytic	47 μF 10V
C10	ECEA1CSS100	Electrolytic	10 μF 16V
C11	ECEA0JU331	Electrolytic	330 μF 6.3V
C12	ECEA1HSS010	Electrolytic	1 μF 50V
C13	YF426390CHJS	Ceramic	39 pF 50V
C14	ECEA1AU101	Electrolytic	100 μF 10V
C16	ECEA1HSSR47	Electrolytic	0.47 μF 50V
C17	ECEA1ASS470	Electrolytic	47 μF 10V
C18	ECQV1H393JZ	Plastic	0.039 μF 50V
C19	YF426103XMS	Ceramic	0.01 μF 50V
C20	ECEA1ASS470	Electrolytic	47 μF 10V
C21	ECEA1CSS100	Electrolytic	10 μF 16V
C22	ECEA1HSS010	Electrolytic	1 μF 50V
C23	YF426390CHJS	Ceramic	39 pF 50V
C24	ECEA1HNR47S	Electrolytic	0.47 μF 50V
C25	ECEA1ASS470	Electrolytic	47 μF 10V
C26	YF426104DMS	Ceramic	0.01 μF 50V
C27,28	YF426473XKS	Ceramic	0.047 μF 50V
C29,30	YF426473XMS	Ceramic	0.047 μF 50V
J1-8	ERJ8GCSJ0R00	Jumper Resistor	
CN1-JM	EMCS1050Z	10 pin Jack Male	
CN2-JM	EMCS0550Z	5 pin Jack Male	
CN3,4-JM	EMCS0250Z	2 pin Jack Male	
CN5-JM	EMCS0350Z	3 pin Jack Male	
CN6-JM	EMCS0250Z	2 pin Jack Male	
CN7,8-JM	EMCS0350Z	3 pin Jack Male	
BI1	EMCZ0614D01V	6 pin Connecting Wire Assy for BI1 and CN3 (Process)	
BI2	EMCZ0516D01V	5 pin Connecting Wire Assy for BI2 and CN7 (Deflection)	

YFVAKA0163AN DISPLAY KEY BOARD A

SYMBOL NO.	PART NO.	DESCRIPTION
PCB008	* YFVAKA0163AN	Printed Circuit Board Assembly

YFVAKA0162AN DISPLAY KEY BOARD B

SYMBOL NO.	PART NO.	DESCRIPTION
PCB009	*YFVAKA0162AN	Printed Circuit Board Assembly

YFVAKA0135AN INT MIC ASSEMBLY

SYMBOL NO.	PART NO.	DESCRIPTION
JK1	YFHSJ0834	Mic Jack
CN6-PF	EMCZ0212B01	2 pin Plug Female for Audio/Lens Control Board

YFVAKA0137AN EXT MIC BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB011	* YFVAKA0137AN	Printed Circuit Board Assembly
JK1,2	YFM0JB21M	Jack (x2)
CN5-PF	EMCZ0316C01	3 pin Plug Female for Audio/Lens Control Board
CN4-PF	EMCZ0215B01	3 pin Plug Female for Audio/Lens Control Board

YFVAKA0136AN EARPHONE BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB012	YFVAKA0136AN	Printed Circuit Board Assembly
JK1	YFM0JB19M	Earphone Jack
CN8-PF	EMCZ0310C01	3 pin Plug Female for Audio/Lens Control Board

YFVAKA0159AN GRIP ASSEMBLY

SYMBOL NO.	PART NO.	DESCRIPTION
CN1-PF	EMCUSB21D24V	10 pin Plug Female for Audio/Lens Control Board (CN107)
CN4-PF	EMCZ0248D02	2 pin Plug Female for Deflection Board
M71	* YFV7SA0083AS	Grip Arm Ass y for Left Side
M72	*YFV4AB0008A2	Grip Arm for Right Side
M73	*YFV4AB0008A2	Gear for Round Stopper
M74	* YFV2VA0011A4	Barrier for Reinforce Plate
M75	YWCC702LR01	Cord Clamp
M76	YFV4JA0008A4	Lock Spring
M77	YFV5RA0010A4	Lock Knob
M78	* YFV5RA0035A4	Slide Knob
M79	* YFV5RA0034B4	Fade Knob
M80	* YFV2TA0028B4	Mounting Bracket A for Grip Band
M81	YFV5YA0006A3	Grip Band
M82	* YFV2TA0030A4	Mounting Bracket B for Grip Band
M83	YFV5JA0004B2	Cover for Left
M84	* YFV5JA0005B2	Cover for Right
M85	YFV5KA0030B3	Battery Case
M86	* YFV1EA0022A4	Special Screw for Battery Case
M87	* YFV2TA0027B3	Mounting Base for Grip Arm
M88	* YFV1HA0010AS	Mounting Pin Ass y
M90	YFV4JA0007A4	Coil Spring
M92	* YFV6JA0015A3	Button for Zoom Switch
M93	* YFV4JA0052A4	Spring for - Battery Polarity
M94	* YFV4JA0053A4	Spring for + Battery Polarity
M95	YFV6JA0013A4	Button for Reck Switch
M98	* YFV4JA0054A4	Coil Spring for Battery Case
M99	YFV2NA0026A4	Spacer

YWV3100ZK07 REC SWITCH BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB013	YWV3100ZK07	Printed Circuit Board Assembly
SW701	KEC10902	Push Switch

YFVPKA0709JA ZOOM SWITCH BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB014	* YFVPKA0709JA	Printed Circuit Board Assembly
SW1, 2	KEG10904	Zoom Push Switch
CN3-PF	EMCZ0240D01	2 pin Plug Female for Audio/Lens Control Board
M96	YFV5KA0029A3	Zoom Case
M97	YFV2FA0013B4	Zoom Switch Rubber Cushion (x2)

YFVKZ3230P8A FADE/AGC SWITCH BOARD

SYM-BOL NO.	PART NO.	DESCRIPTION
PCB015	* YFVKZ3230P8A	Printed Circuit Board Assembly
R1	ERD10TJ432	Carbon 4.3K ohms 1/8W
R2	ERD10TJ911	Carbon 910 ohms 1/8W
SW1	YFSSJ342L4N	Slide Switch
SW2	KEG10903	Push Switch
SW3, 4	YWSSS322	Slide Switch
BI1	EMCLS323D01	3 pin Connecting Wire Ass y for BI1 and REC Board
BI2	EMCZ0723D02V	7 pin Connecting Wire Ass y for BI2 and CN5 (Process)
BI3	EMCZ0320D01V	3 pin Connecting Wire Ass y for BI3 and CN3 (Micro Processor)

WM-4031 MICROPHONE ASSEMBLY

SYM-BOL NO.	PART NO.	DESCRIPTION
M111	*YFWM4031UNIT	Mic Unit Ass y
M113	*YWM6CA0004A4	Wind Screen
M114	*YFWM4031CASE	Head Case Ass y

YFVAKA0157AN for WVP-200E YFVAKA0164AN for WVP-200N EVF MISCELLANEOUS

SYM-BOL NO.	PART NO.	DESCRIPTION
CRT101 ⚠	40JB4	Cathode Ray Tube
L102	ELY15V202A	Deflection Coil Ass y
CN102	E8130J600	8 pin EVF Connector Ass y for CN102 and CN1-PF
CN104	YFS7506P70S	CRT Socket Ass y
M120	*YFV5EB0127A2	EVF Upper Cover for WVP-200E
	*YFV5EC0127A2	EVF Upper Cover for WVP-200N
M121	*YFV5EB0128A2	EVF Bottom Cover
M122 ⚠	*YFV5EA0143A2	CRT Upper Cover
M123 ⚠	*YFV7MA0058AS	CRT Bottom Cover for WVP-200E
	*YFV5EA0144A2	CRT Bottom Cover for WVP-200N
M124 ⚠	YFV5MA0002A4	Shoe
M125	YWCC704WM07	Spring for Shoe
M126	YFV2TA0031A4	Mounting Bracket for Shoulder Belt
M127	YFV1FA0005A4	Nut
M128	YFV4JA0049A4	Spring Plate C for CRT Revolution Stop
M129	YWCC704AM03C	Hold Plate for Shoe
M130	YFV4JA0059A4	Spring Plate A for Open and Shut
M131	YFV3CA0032B3	EVF Lens Holder
M132	YFV1VA0009A4	Lens
M133	YFV5GA0018A4	Eye Cap
M134	YFV2FA0053A4	Cushion
M135	YFV2FA0049B4	Cushion for CRT (x2)
M136	YFV4DA0007A4	Lens Com
M137	YFV2VA0010A4	Barrier for CRT
M138	YFV1UA0004A4	EVF Mirror
M139	YFV4JA0048A4	Spring Plate B for Hold Mirror
M141	YWCC704FM02	Special Screw for Shoe
M142	YFV2FA0014B4	Cushion

SYM-BOL NO.	PART NO.	DESCRIPTION
M143	YFV5RA0033BS	Lock Lever Ass y
M145	YFV7HA0057A4	Safety Label for WVP-200E

YFVPKA0706JB EVF BOARD

SYM-BOL NO.	PART NO.	DESCRIPTION	
PCB016	YFVPKA0706JB	Printed Circuit Board Assembly	
Q1 ⚠	2SD1083	Transistor	
Q2	2SB642-QRS	Transistor	
D1	MA165	Diode	
R1	ERD25FJ565	Carbon	5.6M ohms 1/4W
R2	ERD25FJ275	Carbon	2.7M ohms 1/4W
R3	ERD10TJ105	Carbon	1M ohms 1/8W
R4	ERD10TJ223	Carbon	22K ohms 1/8W
R6	ERD10TJ101	Carbon	100 ohms 1/8W
R7	ERD10TJ222	Carbon	2.2K ohms 1/8W
R8	ERD10TJ103	Carbon	10K ohms 1/8W
R9	ERD10TJ822	Carbon	8.2K ohms 1/8W
R10	ERD10TJ472	Carbon	4.7K ohms 1/8W
VR1	EVM45GA00BV6	Variable Resistor	5.6M ohms
VR2	YWH0651A1M	Variable Resistor	1M ohms
VR3	YWH0651A4R7K	Variable Resistor	4.7K ohms
C1,2	YFDE905B152K	Ceramic	1500 pF 50V
C3	ECQV05823JZ	Plastic	0.082 μF 50V
C4	ECCF1H181J	Ceramic	180 pF
C5	ECEA1HSS010	Electrolytic	1 μF 50V
C6	ECEA1ASS470	Electrolytic	47 μF 10V
C7	ECEA1ASS221	Electrolytic	220 μF 10V
C8 ⚠	ECQP1562JZ	Plastic	5600 pF 100V
C9	ECEA10Z100	Electrolytic	100 μF 10V
C10	ECEA1ASS470	Electrolytic	47 μF 10V
C11	ECEA1ASS470	Electrolytic	47 μF 10V
L1	YFVC101J	Coil	100 μH
L2	ELH5L62	Coil	
L3	YFSIZE201	Coil	
T1 ⚠	YFHIPAKEVF70	Flyback Transformer	
CN1-JM	EMCS0450Z	4 pin Jack Male	
CN2-JM	EMCS0850Z	8 pin Jack Male	

YFUAF-80 AUTO FOCUS LENS UNIT

SYM-BOL NO.	PART NO.	DESCRIPTION
S101	*YFES905-12	Focus Ring Position Sensor
CN107	*YF509235	12 pin Connector Wire Ass'y
M151	*YFES052-08	AF Bottom Cover
M152	*YFES052-09	AF Upper Cover
M153	*YFES052-10	AF Front Cover
M154	*YFES110-15	AF Lens chassis
M156	*YFES113-06	Sensor Shield Cover
M157	*YFES800-25	Insulator Plate
M158	*YF509201	Lens Unit
M159	*YF509232	Iris Cover
M160	*YF509242	Lens Hood Cap

SYM-BOL NO.	PART NO.	DESCRIPTION	
M161	*YF509241	Lens Hood	
M162	*YF509237	Focus Band	
M163	*YF509256	Zoom Focus Motor Ass'y	
M164	*YF509255	Focus Gear Ass'y	
M165	*YF509061	Focus Gear Holder Ass'y	
M166	*YF509075	Zoom Lever	
M167	*YF509073	Lens Mounting Ass'y	
M168	*YF509236	ALC Ass'y	
M170	*YF509233	Switch Cover	
M171	*YF509053	Auto Switch Ass'y	
M172	*YF509055	Push Button	
M173	*YF509046	Switch Board Ass'y	

YFES950-43A
AUTO FOCUS BOARD-A

SYM-BOL NO.	PART NO.	DESCRIPTION	
PCB021	*YFES950-43A	Printed Circuit Board Assembly	
IC001	YFSS514-77	IC	
IC005	NJM78L05A	IC	
Q011	2SC2603	Transistor	
Q012	2SA1115	Transistor	
Q013, 014	2SC2603	Transistor	
Q015	2SD965	Transistor	
Q016	2SA720	Transistor	
Q017	2SD965	Transistor	
Q018	2SA720	Transistor	
Q019	2SD965	Transistor	
Q020-25	2SC2603	Transistor	
X002	YFSS514-48	Crystal	400 KHz
D012	1N4002	Diode	
D013	MZ305	Diode	
D014	MA165	Diode	
R033	YFSC049-64	Carbon	22 K ohm 1/6W
R034	YFSC049-74	Carbon	560K ohms 1/6W
R035-038	YFSC049-64	Carbon	22K ohms 1/6W
R039	YFSC049-59	Carbon	4.7K ohms 1/6W
R040	YFSC049-55	Carbon	270 ohms 1/6W
R041	YFSC049-78	Carbon	4.7 ohms 1/6W
R042	YFSC049-64	Carbon	22K ohms 1/6W
R043	YFSC049-58	Carbon	2.2K ohms 1/6W
R044	YFSC049-59	Carbon	4.7K ohms 1/6W
R045	YFSC049-56	Carbon	1K ohms 1/6W
R046	YFSC049-59	Carbon	4.7K ohms 1/6W
R047	YFSC049-56	Carbon	1K ohms 1/6W
R048	YFSC049-58	Carbon	2.2K ohms 1/6W
R049	YFSC049-59	Carbon	4.7K ohms 1/6W
R050, 051	YFSC049-62	Carbon	10K ohms 1/6W
R052	YFSC049-64	Carbon	22K ohms 1/6W
R053	YFSC049-82	Carbon	330K ohms 1/6W
R054	YFSC049-62	Carbon	10K ohms 1/6W
R055	YFSC049-65	Carbon	33K ohms 1/6W
R056, 057	YFSC049-64	Carbon	22K ohms 1/6W
R058	YFSC049-65	Carbon	33K ohms 1/6W
R059, 060	YFSC049-64	Carbon	22K ohms 1/6W
R061	YFSC049-65	Carbon	33K ohms 1/6W
R062, 063	YFSC049-64	Carbon	22K ohms 1/6W
R064	YFSC049-69	Carbon	100K ohms
R065	YFSC049-56	Carbon	1K ohms 1/6W
Z001	YFSS515-06	Block Resistor	
C016	YFSC002-50	Ceramic	120 pF 50V
C017	YFSC002-41	Ceramic	470 pF
C018	ECEAIAK331	Electrolytic	330 μF 10V
C019	ECEAICK100	Electrolytic	10μF 16V
C020	ECEAIAK220	Electrolytic	22 μF 10V
C021	YFSC002-52	Ceramic	0.015 μF 50V
C022	YFSC002-11	Ceramic	1000 pF 50V
C023	ECEA1HS010	Electrolytic	1 μF 50V
C024	ECEA1HS0IR1	Electrolytic	0.1 μF 50V
C025	ECEA1HS2R2	Electrolytic	2.2 μF 50V
C026-032	YFSC004-20	Ceramic	0.01 μF 50V
C033	ECUX1H473MD	Ceramic	0.047 μF 50V
L001	YFFL5H560K	Inductor	56 μH
L002	YFFL5H101K	Inductor	100 μH
CN002-JM	EMCS0650Z	6 pin Jack Male	
CN003-JM	EMCS0250Z	2 pin Jack Male	
CN004-JM	EMCS0850Z	8 pin Jack Male	

YFES950-43B
AUTO FOCUS BOARD-B

SYM-BOL NO.	PART NO.	DESCRIPTION	
PCB022	*YFES950-43B	Pronted Circuit Board Assembly	
IC003	UPC393C	IC	
IC004	UPD4069	IC	
Q001	2SA1115	Transistor	
Q002	2SC2603	Transistor	
Q003	2SN873	Transistor	
Q004	2SD965	Transistor	
Q005	2SC1317	Transistor	
Q006	2SC2603	Transistor	
Q007	2SA1115	Transistor	
Q008-010	2SC2603	Transistor	
D005	MZ308	Diode	
D006-011	MA165	Diode	
TH001,002	YF SC010-09	Thermistor	
R005	YFSC049-60	Carbon	5.6K ohms 1/6W
R006	YFSC049-64	Carbon	22K ohms 1/6W
R007	YFSC049-58	Carbon	2.2K ohms 1/6W
R008	YFSC049-60	Carbon	56K ohms 1/6W
R009	ERC14GJ4R7	Solid	4.7 ohms 1/4W
R010	YFSC049-79	Carbon	470 ohms 1/6W
R011, 012	YFSC049-53	Carbon	27 ohms 1/6W
R013	YFSC049-56	Carbon	1K ohms 1/6W
R014	YFSC049-70	Carbon	220K ohms 1/6W
R015	YFSC049-68	Carbon	68K ohms 1/6W
R016	YFSC049-57	Carbon	1.5K ohms 1/6W
R017	YFSC049-66	Carbon	47K ohms 1/6W
R018	YFSC049-62	Carbon	10K ohms 1/6W
R019	YFSC049-73	Carbon	39K ohms 1/6W
R020	YFSC049-54	Carbon	120 ohms 1/6W
R021	YFSC049-60	Carbon	5.6K ohms 1/6W

SYMBOL NO.	PART NO.	DESCRIPTION	
R022	YFSC049-58	Carbon	2.2K ohms 1/6W
R023	YFSC049-59	Carbon	4.7K ohms 1/6W
R024	YFSC049-62	Carbon	10K ohms 1/6W
R025	YFSC049-81	Carbon	12K ohms 1/6W
R026	YFSC049-69	Carbon	100K ohms 1/6W
R027	YFSC049-64	Carbon	22K ohms 1/6W
R028	YFSC049-69	Carbon	100K ohms 1/6W
R029	YFSC049-82	Carbon	330K ohms 1/6W
R030, 031	YFSC049-62	Carbon	10K ohms 1/6W
R032	YFSC049-83	Carbon	30K ohms 1/6W
VR001	EVNBLAA00B34	Variable Resistor	30K ohms
VR002	EVNALAA00B54	Variable Resistor	50K ohms
VR003,004	EVNALAA00B14	Variable Resistor	10K ohms
C005	ECEA1AS471	Electrolytic	470 µF 10V
C006	YFSC002-51	Ceramic	3900 pF 50V
C007	YFSC004-20	Ceramic	0.01 µF 50V
C008	ECEA1AS220	Electrolytic	22 µF 10V
C009, 010	YFSC004-20	Ceramic	0.01 µF 50V
C011	YFSC002-11	Ceramic	1000 pF
C012	ECSF1VE334	Electrolytic	0,33 µF 35V
C013	ECQP1271JZ	Plastic	270 pF 100V
C014	ECEA1HK2R2	Electrolytic	2.2 µF 50V
C015	YFSC002-34	Ceramic	2200 pF 50V
T002	YFSS516-10	IFT	
E001	YFSG800-13	10 pin Flat Cable	
CN005	YFSS111-78	3 pin Connector	
M155	YFES113-10	Shield Case	

YFES950-43C
AUTO FOCUS BOARD-C

SYMBOL NO.	PART NO.	DESCRIPTION	
PCB023	*YFES950-43C	Printed Circuit Board Assembly	
IC002	TA7120P	IC	
D001-004	MA171	Diode	
R001	YFSC049-80	Carbon	8.2K ohms 1/6W
R002	YFSC049-59	Carbon	4.7K ohms 1/6W
R003	YFSC049-67	Carbon	56K ohms 1/6W
R004	YFSC049-66	Carbon	47K ohms 1/6W
C001	YFSC102-25	Ceramic	2200 pF 400V
C002	YFSC004-20	Ceramic	0.01 µF 50V
C003	ECEA1CK100	Electrolytic	10 µF 16V
C004	ECEA1HKR22	Electrolytic	0.22 µF 50V
T001	YFSS516-09	Transformer	
CN001	YFSS111-88	5 pin Connector	

ACCESSORY PARTS/PACKAGING PARTS

SYMBOL NO.	PART NO.	DESCRIPTION
BAT101	UM3NEP	Battery
M181	*YFV5MA0010A4	Shoe
M182 ⚠	*YFD8QA0319AN	Operating Instruction for WVP-200E
⚠	*YFV8QA0320BN	Operasing Instruction for WVP-200N
M184	YFV8RA0023BN	Handbook for WVP-200E
	YFV8RA0027AN	Handbook for WVP-200N
M185	YFV8UA0004A4	Warranty Card for WVP-200N/A

SYMBOL NO.	PART NO.	DESCRIPTION
M186	YWT10X10C03	Polyethylene Bag for Shoe
M187	YWT10X35C03	Polyethylene Bag for Microphone
M188	YZB20X35A02	Polyethylene Bag for EVF and Cable
M189	XZB38X50A03	Polyethylene Bag for Camera
M190	XZB26X40C05	Polyethylene Bag for Operating Instruction
M195	*YFV9CA0303BN	Packaging Case for WVP-200E
	*YFV9CA0304BN	Packaging Case for WVP-200N
	*YFV9CA0305BN	Packaging Case for WVP-200N/A
M196	*YFV8RA0016A3	Tag for WVP-200N
	*YFV8RA0017A3	Tag for WVP-200E

WV-CR10E/N CAMERA REMOTE CONTROLLER

MISCELLANEOUS

SYMBOL NO.	PART NO.	DESCRIPTION
E001	*YFRCABLE90A	Remote Control Cable Ass'y
M002	*YFV5WA0080AS	Upper Cover Ass'y for WV-CR10E
	*YFV5WA0070AS	Upper Cover Ass'y for WV-CR10N
M003	YFV5EA0054A2	Bottom Cover
M004	YFV5RA0011A4	Slide Switch Knob
M005	YFV6JA0006A4	Push Knob (X2)
M006	YFV6JA0011A4	Zoom and Focus Knob (X2)
M007	YFV6JA0012A4	Lock Knob
M008	YFV2CA0012A4	Mounting Plate
M009	YFV2CA0018A4	Mounting Angle
M010	YFV2SA0024A4	Mounting Plate for 8 pin Connector
M011	YFV4RA0002A4	Lock Arm Lever
M012	YFV2FA0021C4	Switch Cushion
M013	YFV2PA0018B4	Insulater Sheet for Circuit Board
M014	YFV4JA0015A4	Leaf Spring
M015	YFV4JA0016A4	Coil Spring
M016	*YFV7QA0159A4	Main Label for WV-CR10E
	*YFV7QA0137A4	Main Label for WV-CR10N
M017	YVZC700RB50	Serial No. Label
M018	*YFV4DA0003A4	Look Cam
M019	YFV7SA0046A4	8pin Connector Label
M022	YFV5MA0010A4	Shoe

YFVPKB0101JA
CAMERA REMOTE CONTROL BOARD

SYMBOL NO.	PART NO.	DESCRIPTION		
PCB001	YFVPKB0101JA	Printed Circuit Board Assembly		
Q001,002	2SD636-QRS	Transistor		
Q003	2SB788-STU	Transistor		
Q004,005	2SD636-QRS	Transistor		
R001	ERD10TJ273	Carbon	27KΩ	1/8W
R002	ERD10TJ393	Carbon	39KΩ	1/8W
R003	ERD10TJ123	Carbon	12KΩ	1/8W
R004	ERD10TJ273	Carbon	27KΩ	1/8W
R005~007	ERD10TJ223	Carbon	22KΩ	1/8W
R008	ERD10TJ913	Carbon	91KΩ	1/8W

SYM-BOL NO.	PART NO.	DESCRIPTION
R009	ERD10TJ752	Carbon 7.5KΩ 1/8W
R010	ERD10TJ912	Carbon 9.1KΩ 1/8W
R011	ERD10TJ104	Carbon 100KΩ 1/8W
R012	ERD10TJ153	Carbon 15KΩ 1/8W
R013,014	ERD10TJ201	Carbon 200Ω 1/8W
R015	ERD10TJ104	Carbon 100KΩ 1/8W
R016	ERD10TJ153	Carbon 15KΩ 1/8W
C001	ECKF1H301KB	Ceramic 300pF 50V
C002	ECEA1HSS010	Electrolytic 1μF 50V
C003,004	ECKF1H102KB	Ceramic 1000pF 50V
C005	ECKF1H681KB	Ceramic 680pF 50V
SW001,002	EVQQS405K	Push Switch
SW003	YWSSF-012M	Slide Switch
SW004,005	KEG10904	Push Switch
SW006,007	EVQQS405K	Push Switch
CN001-JM	EMCS1350ZL	13 pin Jack Male
M025	YFV2NA0005A4	Spacer for Switch

YFVPKB0101J2
CONNECTOR BOARD

SYM-BOL NO.	PART NO.	DESCRIPTION
PCB002	*YFVPKB0101J2	Printed Circuit Board Assembly
CN106	YFRP610RD8S	8 pin Connector

ACCESSORY PARTS/PACKAGING PARTS

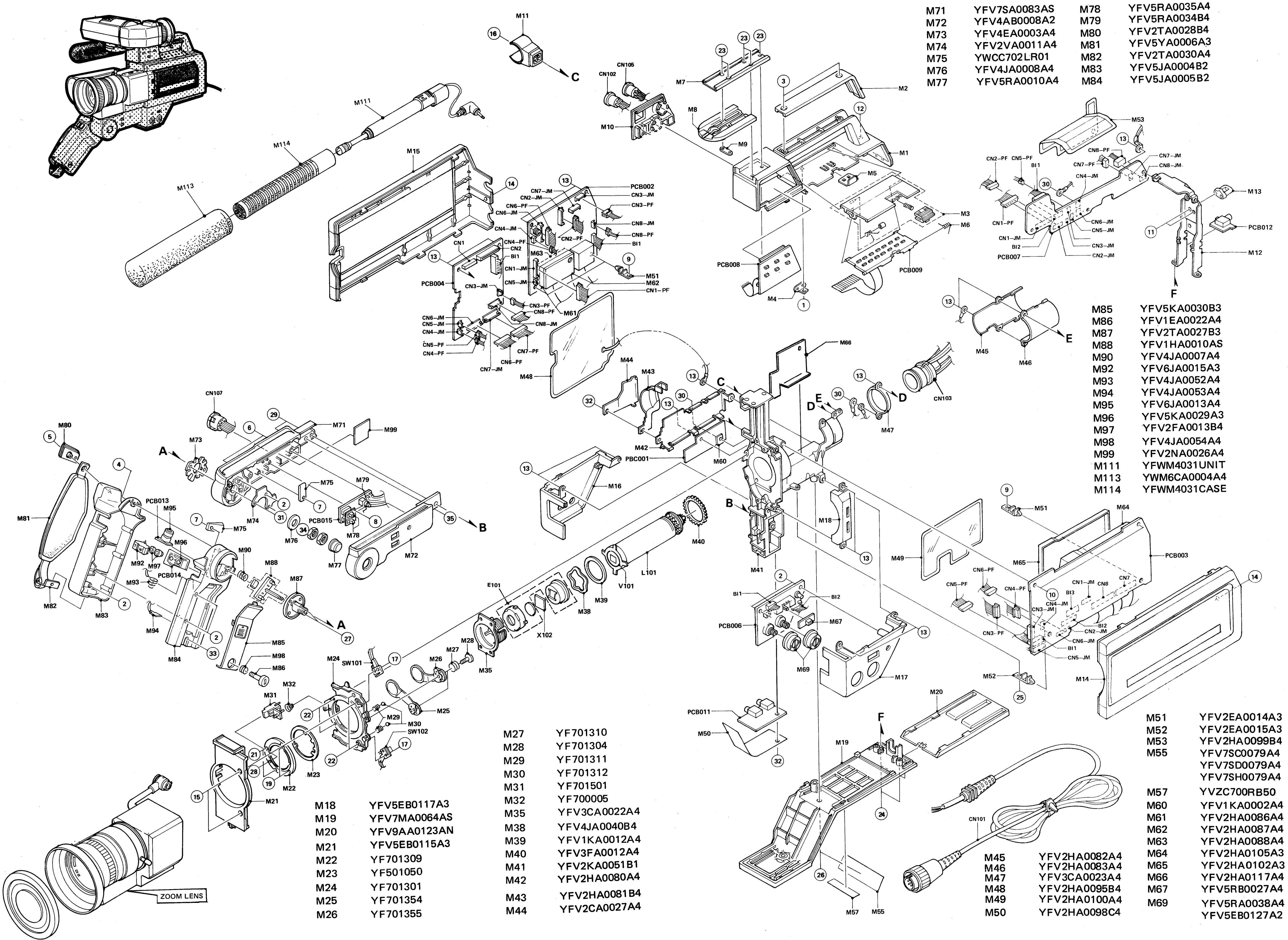
SYM-BOL NO.	PART NO.	DESCRIPTION
M021	*YFV8QA0108AN	Operating Instruction for WV-CR10E
M022	*YFV8QA0113AN	Operating Instruction for WV-CR10N
M023	*YFV5MA0010A4	Shoe
	YFV8EA0001A4	Poliethyene Bag for Remote Controller
M024	YWT10X10C03	Polyethylene Bag for Shoe
M025	YWT15X20C03	Polyethylene Bag for Operating Instruction
M026	YWT20X35C03	Polyethylene Bag for Power Cord
M028	YFV9CA0145AN	Packaging Case for WV-CR10E
	YFV9CA0133AN	Packaging Case for WV-CR10N

EXPLODED VIEWOF CAMERA

○ Numbers show Screws

No.	Screw	Description
①	XTB26+6BFX	Binding Head Tapping Screw
②	XTB26+8BFX	Binding Head Tapping Screw
③	XTB26+6BFXK	Binding Head Tapping Black Screw
④	XTB26+8BFXK	Binding Head Tapping Black Screw
⑤	XTB26+10BFXK	Binding Head Tapping Black Screw
⑥	XTB3+25BFXK	Binding Head Tapping Black Screw
⑦	XTN26+6BFX	Pan Head Tapping Screw
⑧	XTN26+8BFX	Pan Head Tapping Screw
⑨	XTW26+8EFX	Washer Head Tapping Screw
⑩	XSB2+4FX	Binding Head Screw
⑪	XSB2+5FX	Binding Head Screw
⑫	XSB26+4FX	Binding Head Screw
⑬	XSB26+6FX	Binding Head Screw
⑭	XSB26+6FC	Binding Head Screw
⑮	XSB26+6FXK	Binding Head Black Screw
⑯	XSB26+16FXK	Binding Head Black Screw
⑰	XSB14+5FX	Binding Head Screw
⑱	XSB4+16FX	Binding Head Screw
⑲	XSN2+4FC	Pan Head Machine Screw
⑳	XSN2+6FC	Pan Head Machine Screw
㉑	XSN2+8FC	Pan Head Machine Screw
㉒	XSS2+4FX	Flush Head Machine Screw
㉓	XSS2+6FXK	Flush Head Machine Black Screw
㉔	XSS26+4FX	Flush Head Machine Screw
㉕	XSS26+6FX	Flush Head Machine Screw
㉖	XSS26+6FXK	Flush Head Machine Black Screw
㉗	XSS3+8FX	Flush Head Machine Screw
㉘	XTS2+4FX	Flush Head Machine Tapping Screw
㉙	XYN4+C20FX	Machine Screw and Washer Assembly
㉚	XYN26+C6FX	Machine Screw and Washer Assembly
㉛	XYN3+AC12FX	Machine Screw and Washer Assembly
㉜	XYN26+F6FX	Machine Screw and Washer Assembly
㉝	JE–2	E Ring
㉞	XWE8JFX	Small Round Plain Washer
㉟	XTS26+8BFX	Flush Head Machine Tapping Screw

PCB001	YFVPKA2002EA
PCB002	YFVPKA2001EA
PCB003	YFVPKA2003EA
PCB004	YFVPKA2004EA
PCB006	YFVAKA0158AN
PCB007	YFVPKA2005EA
PCB008	YFVAKA0163AN
PCB009	YFVAKA0162AN
PCB011	YFVAKA0137AN
PCB012	YFVAKA0136AN
PCB013	YWV3100ZK07
PCB014	YFVPKA0709JA
PCB015	YFVKZ3230P8A
V101	YFH4151KIT
X102	YFXTALLPFC70
L101	YFH4151KIT
SW101	D2MQ1L
SW102	D2MQ1L
E101	YFFA-0003
CN101	YFCABLE3230
CN102	D8113N601
CN103	VIDSOKETC70
CN107	EMCUSA20D04
M1	YFV5EB0124A1
M2	YFV5EB0125A1
M3	YFV5EA0126AS
M4	YFV2SA0078A4
M5	YFV2CA0024B4
M6	YFV4JA0043A4
M7	YFV5MA0007B4
M8	YFV6FA0019B3
M9	YFV1FA0004A4
M10	YFV9AA0142AN
M11	YFV3CA0026A4
M12	YFV2KB0052A4
M13	YFV2TA0031A4
M14	YFV9AA0140AN YFV9AA0143AN
M15	YFV9AA0141AN YFV9AA0144AN
M16	YFV5EC0118A3
M17	YFV5ED0119A3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C
CN105
CN102
M10
M7
M8
M9
M2
M1
M5
M3
M6
M4
PCB008
PCB009
M53
CN2–PF
CN5–PF
BI1
CN8–PF
CN7–JM
CN8–JM
CN7–PF
CN4–JM
CN1–PF
CN1–JM
BI2
PCB007
CN6–JM
CN5–JM
CN3–JM
CN2–JM
M13
PCB012
M12
F
M111
M114
M113
M15
PCB002
CN3–JM
CN3–PF
CN7–JM
CN2–JM
CN6–PF
CN6–JM
CN4–JM
CN8–JM
CN8–PF
CN2–PF
CN4–PF
CN2
CN1
BI1
M63
CN1–JM
CN5–JM
M51
M62
CN1–PF
PCB004
CN3–JM
CN3–PF
CN7–PF
CN8–JM
M61
CN6–JM
CN5–JM
CN4–JM
CN5–PF
CN4–PF
CN7–JM
M48
M45
M46
E
M66
M44
M43
C
D
E
D
M47
CN103
CN107
M71
M99
M80
A
M73
M42
PBC001
M60
M16
M75
M79
PCB013
M95
M96
M76
M77
M78
PCB015
M72
B
M81
M92
M97
M93
PCB014
M90
M88
M87
M74
M82
M83
M94
M84
M85
M98
M86
A
M18
M40
L101
V101
M41
B
M49
M64
M65
PCB003
M51
CN6–PF
CN5–PF
CN4–PF
CN1–JM
CN8
CN7
BI3
CN4–JM
CN3–JM
BI2
CN2–JM
CN6–JM
BI1
CN5–JM
CN3–PF
M14
E101
X102
M38
M39
M35
M28
M27
M26
M25
SW101
M24
M32
M31
M29
M30
SW102
M23
M22
M21
PCB006
BI1
BI2
M67
M69
M17
M52
PCB011
M50
M20
F
M19
CN101
M57
M55
ZOOM LENS

M71	YFV7SA0083AS	M78	YFV5RA0035A4
M72	YFV4AB0008A2	M79	YFV5RA0034B4
M73	YFV4EA0003A4	M80	YFV2TA0028B4
M74	YFV2VA0011A4	M81	YFV5YA0006A3
M75	YWCC702LR01	M82	YFV2TA0030A4
M76	YFV4JA0008A4	M83	YFV5JA0004B2
M77	YFV5RA0010A4	M84	YFV5JA0005B2

M85	YFV5KA0030B3
M86	YFV1EA0022A4
M87	YFV2TA0027B3
M88	YFV1HA0010AS
M90	YFV4JA0007A4
M92	YFV6JA0015A3
M93	YFV4JA0052A4
M94	YFV4JA0053A4
M95	YFV6JA0013A4
M96	YFV5KA0029A3
M97	YFV2FA0013B4
M98	YFV4JA0054A4
M99	YFV2NA0026A4
M111	YFWM4031UNIT
M113	YWM6CA0004A4
M114	YFWM4031CASE

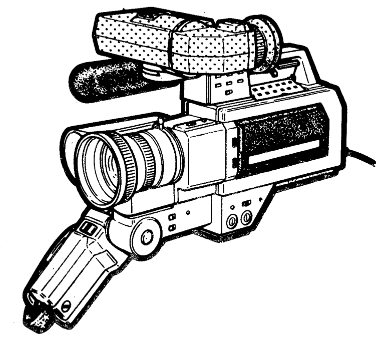
M18	YFV5EB0117A3
M19	YFV7MA0064AS
M20	YFV9AA0123AN
M21	YFV5EB0115A3
M22	YF701309
M23	YF501050
M24	YF701301
M25	YF701354
M26	YF701355

M27	YF701310
M28	YF701304
M29	YF701311
M30	YF701312
M31	YF701501
M32	YF700005
M35	YFV3CA0022A4
M38	YFV4JA0040B4
M39	YFV1KA0012A4
M40	YFV3FA0012A4
M41	YFV2KA0051B1
M42	YFV2HA0080A4
M43	YFV2HA0081B4
M44	YFV2CA0027A4

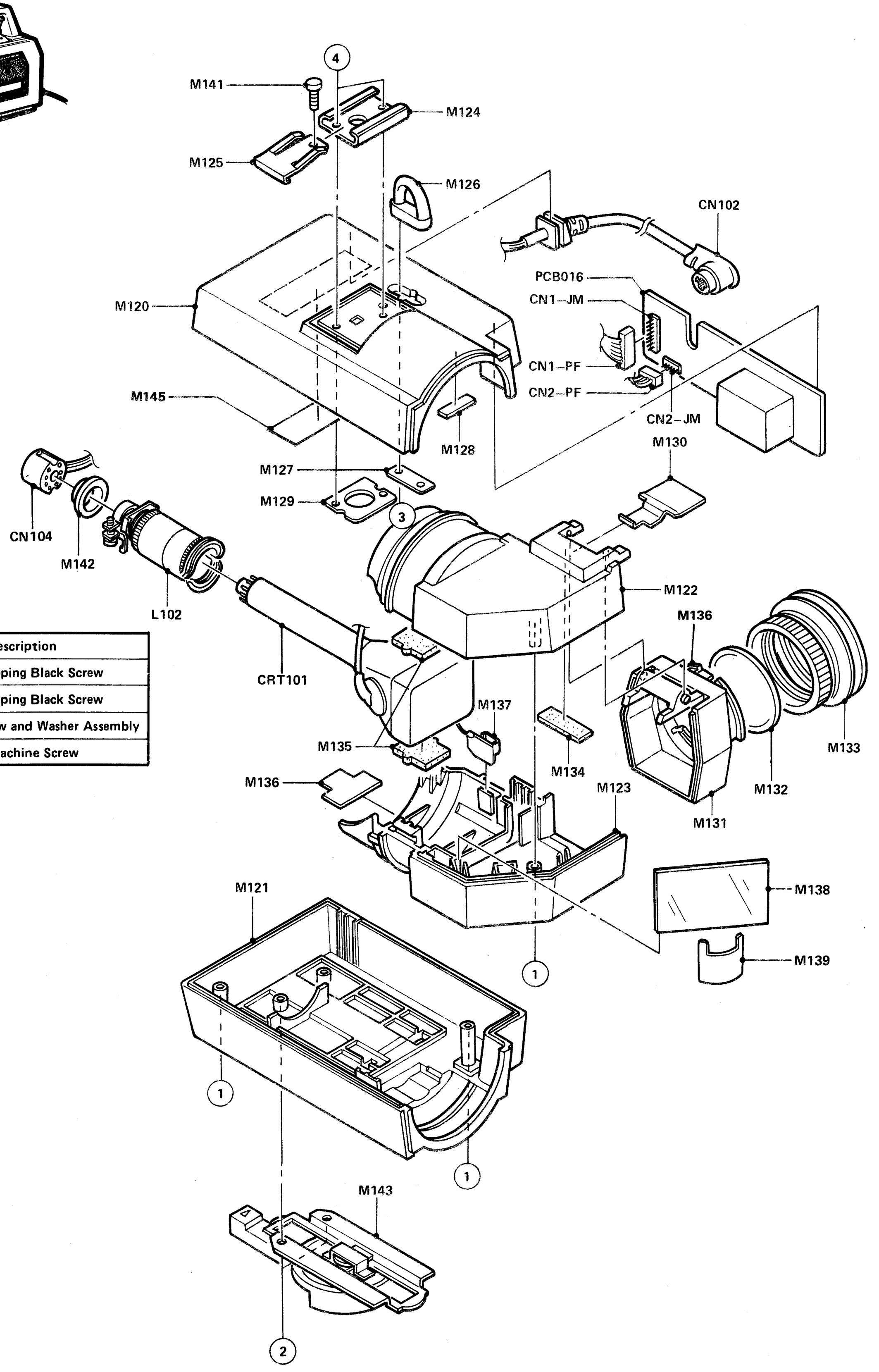
M45	YFV2HA0082A4
M46	YFV2HA0083A4
M47	YFV3CA0023A4
M48	YFV2HA0095B4
M49	YFV2HA0100A4
M50	YFV2HA0098C4

M51	YFV2EA0014A3
M52	YFV2EA0015A3
M53	YFV2HA0099B4
M55	YFV7SC0079A4 YFV7SD0079A4 YFV7SH0079A4
M57	YVZC700RB50
M60	YFV1KA0002A4
M61	YFV2HA0086A4
M62	YFV2HA0087A4
M63	YFV2HA0088A4
M64	YFV2HA0105A3
M65	YFV2HA0102A3
M66	YFV2HA0117A4
M67	YFV5RB0027A4
M69	YFV5RA0038A4 YFV5EB0127A2

EXPLODED VIEW



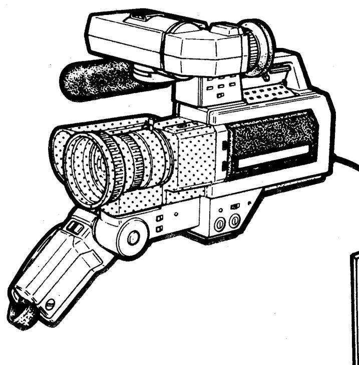
ELECTRIC VIWFINDER


4
M141
M124
M125
M126
CN102
PCB016
CN1–JM
M120
CN1–PF
CN2–PF
CN2–JM
M145
M128
M127
M130
M129
3
CN104
M142
L102
M122
M136
CRT101
M137
M135
M136
M134
M123
M131
M132
M133
M121
M138
M139
1
1
1
M143
2

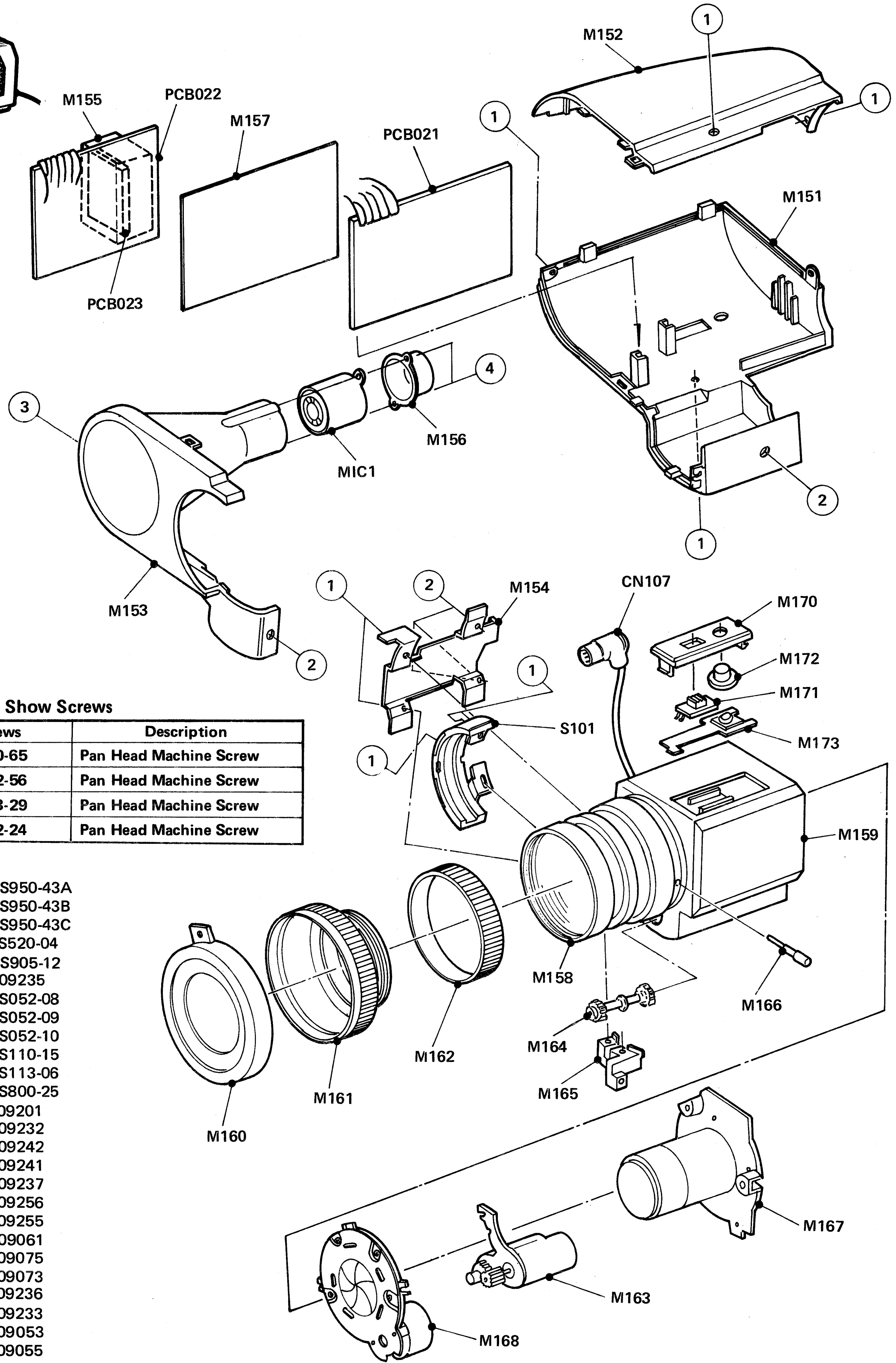
○Numbers show Screws

No.	Screw	Description
①	XTN26+25BFXK	Pan Head Tapping Black Screw
②	XTN26+8BFXK	Pan Head Tapping Black Screw
③	XYM2+F8FX	Machine Screw and Washer Assembly
④	XSS2+5FXK	Flush Head Machine Screw

PCB016	YFVPKA0706JB
CRT101	40JB4
L102	ELY15V202A
CN102	E8130J600
CN104	YFS7506P70S
M120	YFV5EB0127A2 YFV5EC0127A2
M121	YFV5EB0128A2
M122	YFV5EA0143A2
M123	YFV7MA0058AS YFV5EA0144A2
M124	YFV5MA0002A4
M125	YWCC704WM07
M126	YFV2TA0031A4
M127	YFV1FA0005A4
M128	YFV4JA0049A4
M129	YWCC704AM03C
M130	YFV4JA0059A4
M131	YFV3CA0032B3
M132	YFV1VA0009A4
M133	YFV5GA0018A4
M134	YFV2FA0053A4
M135	YFV2FA0049B4
M136	YFV4DA0007A4
M137	YFV2VA0010A4
M138	YFV1UA0004A4
M139	YFV4JA0048A4
M141	YWCC704FM02
M142	YFV2FA0014B4
M143	YFV5RA0033BS
M145	YFV7HA0057A4



AUTO FOCUS LENS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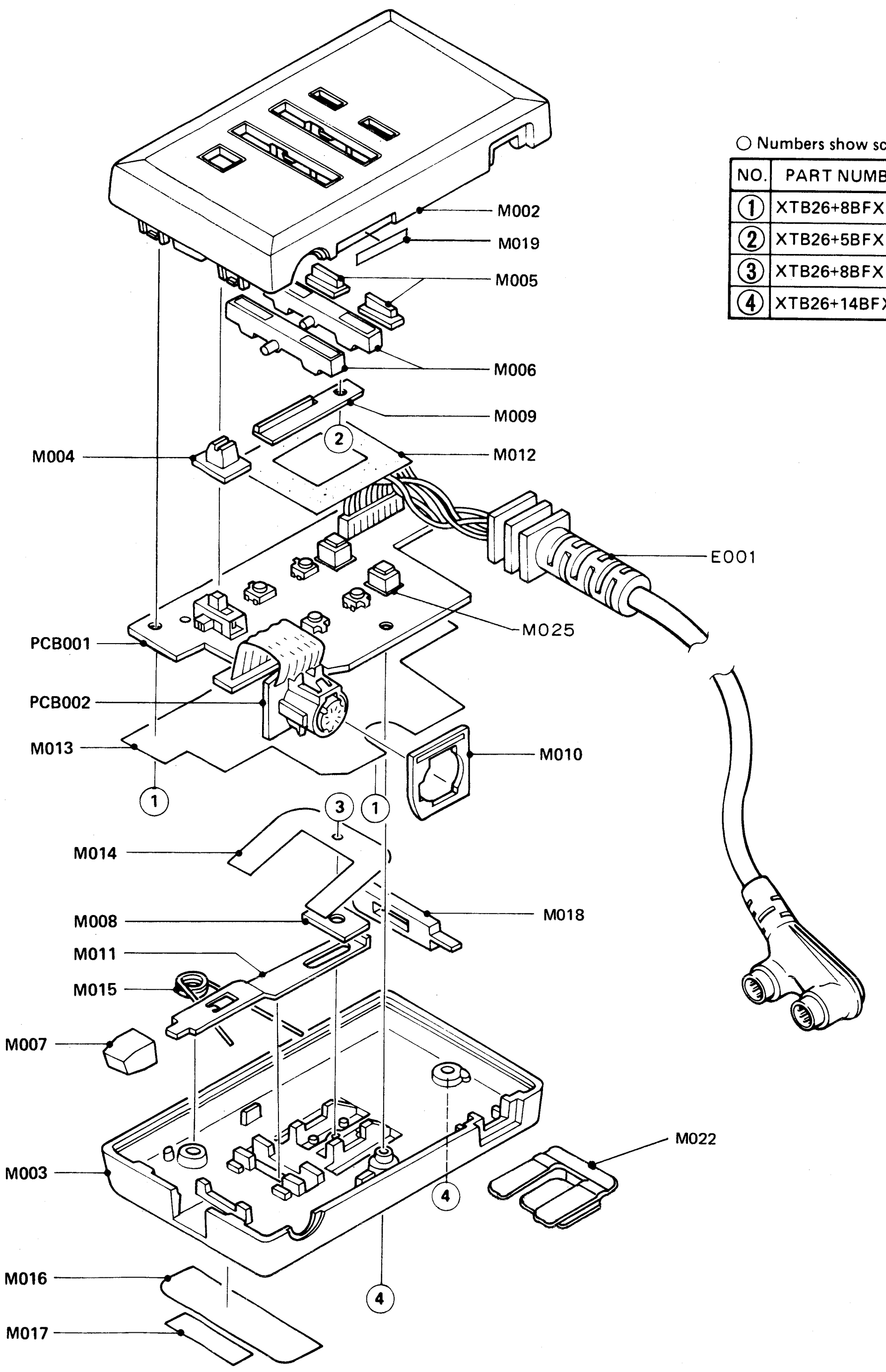
1
M155
PCB022
M157
PCB021
M151
PCB023
4
3
M156
MIC1
2
1
M153
2
1
2
M154
CN107
M170
M172
M171
1
S101
M173
1
M159
M158
M166
M164
M162
M161
M165
M160
M167
M163
M168

○ Numbers Show Screws

No.	Screws	Description
①	YFSG000-65	Pan Head Machine Screw
②	YFSG022-56	Pan Head Machine Screw
③	YFSG023-29	Pan Head Machine Screw
④	YFSG022-24	Pan Head Machine Screw

PCB021	YFES950-43A
PCB022	YFES950-43B
PCB023	YFES950-43C
X001	YFSS520-04
S101	YFES905-12
CN107	YF509235
M151	YFES052-08
M152	YFES052-09
M153	YFES052-10
M154	YFES110-15
M156	YFES113-06
M157	YFES800-25
M158	YF509201
M159	YF509232
M160	YF509242
M161	YF509241
M162	YF509237
M163	YF509256
M164	YF509255
M165	YF509061
M166	YF509075
M167	YF509073
M168	YF509236
M170	YF509233
M171	YF509053
M172	YF509055
M173	YF509046

EXPLODED VIEWOF CAMERA REMOTE CONTROLLER

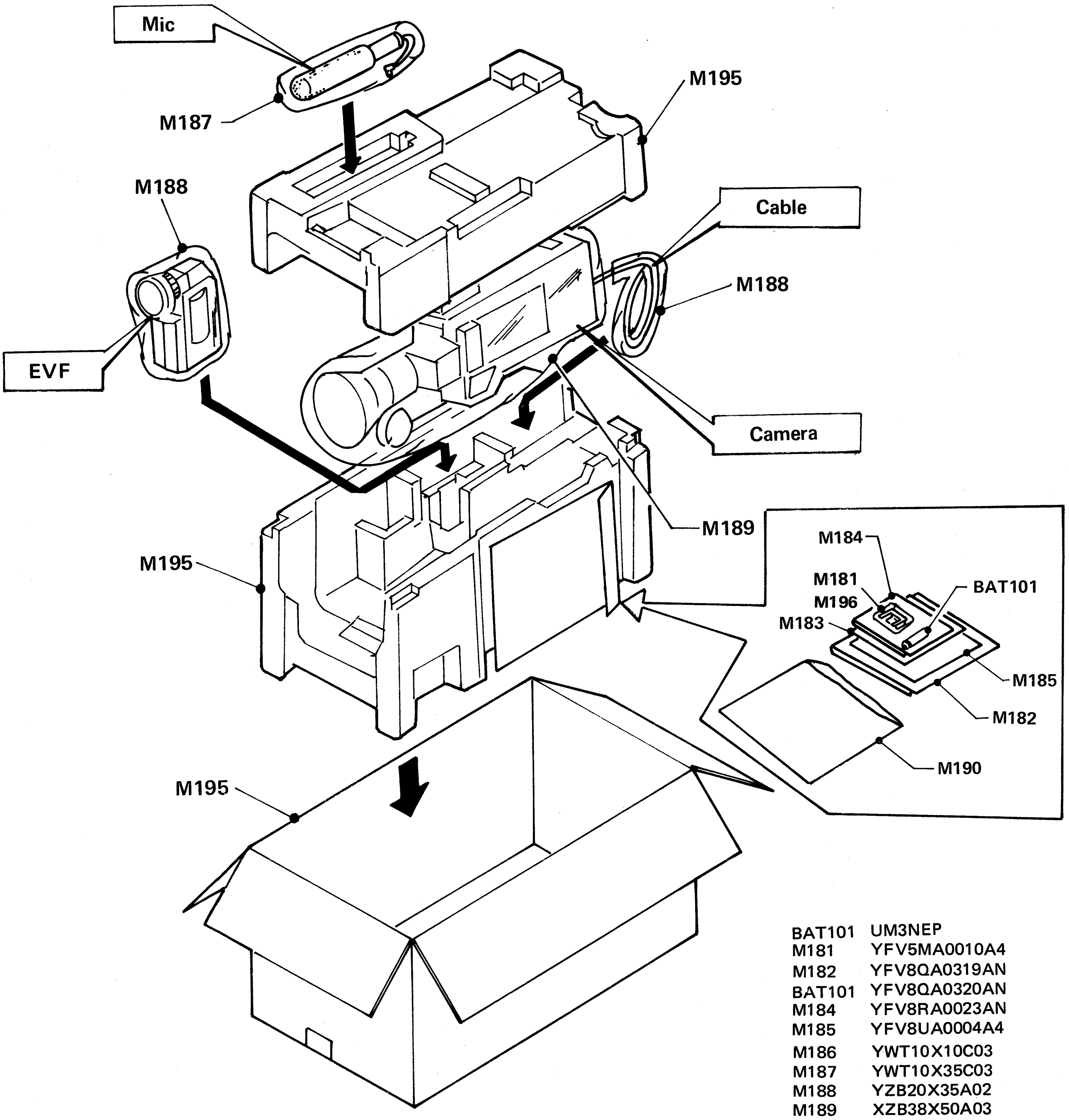

M002
M019
M005
M006
M009
②
M012
M004
E001
M025
PCB001
PCB002
M013
M010
①
③
①
M014
M008
M018
M011
M015
M007
M022
M003
④
M016
M017
④

○ Numbers show screws

NO.	PART NUMBER	DESCRIPTION
①	XTB26+8BFX	Binding Head Tapping Screws
②	XTB26+5BFX	Binding Head Tapping Screws
③	XTB26+8BFXK	Binding Head Tapping Screws (Black)
④	XTB26+14BFXK	Binding Head Tapping Screws (Black)

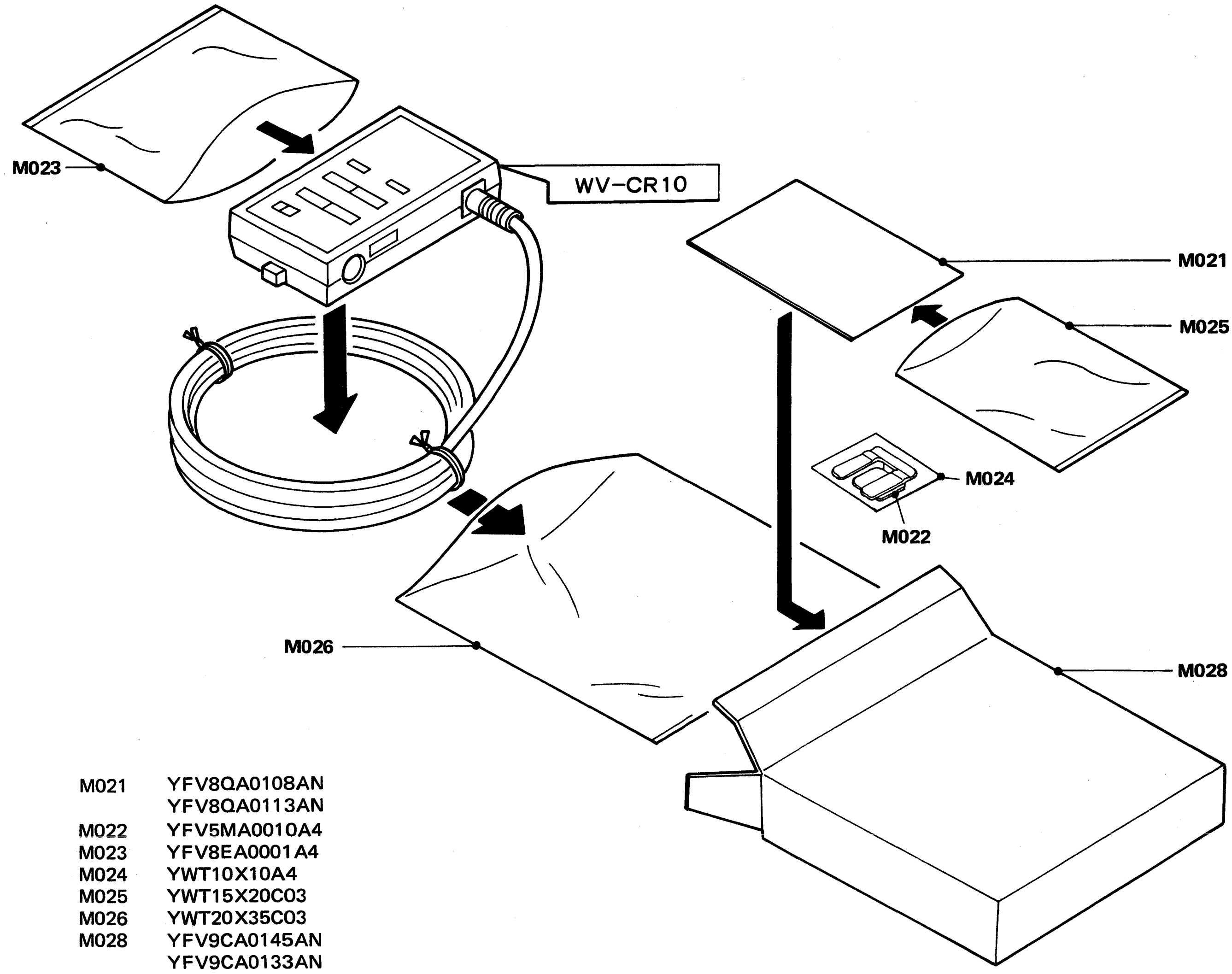
PCB001	YFVPKB0101JA
PCB002	YFVPKB0101J2
E001	YFRCABLE90
M002	YFV5WA0080AS
M003	YFV5EA0054A2
M004	YFV5RA0011A4
M005	YFV6JA0006A4
M006	YFV6JA0011A4
M007	YFV6JA0012A4
M008	YFV2CA0012A4
M009	YFV2CA0018A4
M010	YFV2SA0024A4
M011	YFV4RA0002A4
M012	YFV2FA0021C4
M013	YFV2PA0018B4
M014	YFV4JA0015A4
M015	YFV4JA0016A4
M016	YFV7QA0153A4 YFV7QA0137A4
M017	YVZC700RB50
M018	YFV4DA0003A4
M019	YFV7SA0046A4
M022	YFV5MA0010A4

PACKAGING OF CAMERA


Mic
M195
M187
M188
Cable
M188
EVF
Camera
M189
M184
M181
M196
BAT101
M183
M195
M185
M182
M195
M190

BAT101	UM3NEP
M181	YFV5MA0010A4
M182	YFV8QA0319AN
BAT101	YFV8QA0320AN
M184	YFV8RA0023AN
M185	YFV8UA0004A4
M186	YWT10X10C03
M187	YWT10X35C03
M188	YZB20X35A02
M189	XZB38X50A03
M190	XZB26X40C05M
M195	YFV9CA0303BN YFV9CA0304BN YFV9CA0305BN
M196	YFV8RA0016A3 YFV8RA0017A3

PACKAGING OF CAMERA REMOTE CONTROLLER


M023
WV-CR10
M021
M025
M024
M022
M026
M028

M021	YFV8QA0108AN YFV8QA0113AN
M022	YFV5MA0010A4
M023	YFV8EA0001A4
M024	YWT10X10A4
M025	YWT15X20C03
M026	YWT20X35C03
M028	YFV9CA0145AN YFV9CA0133AN

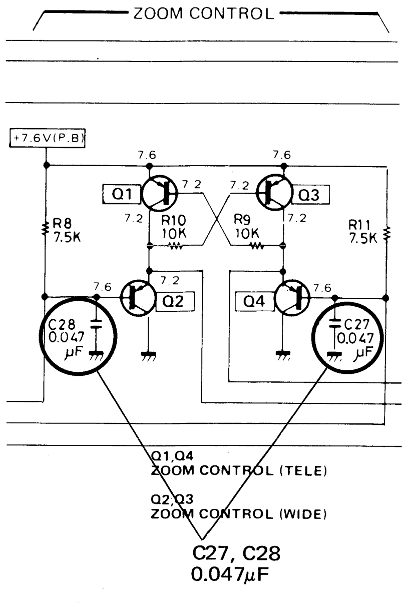
ORDER NO. VKD83090782S8

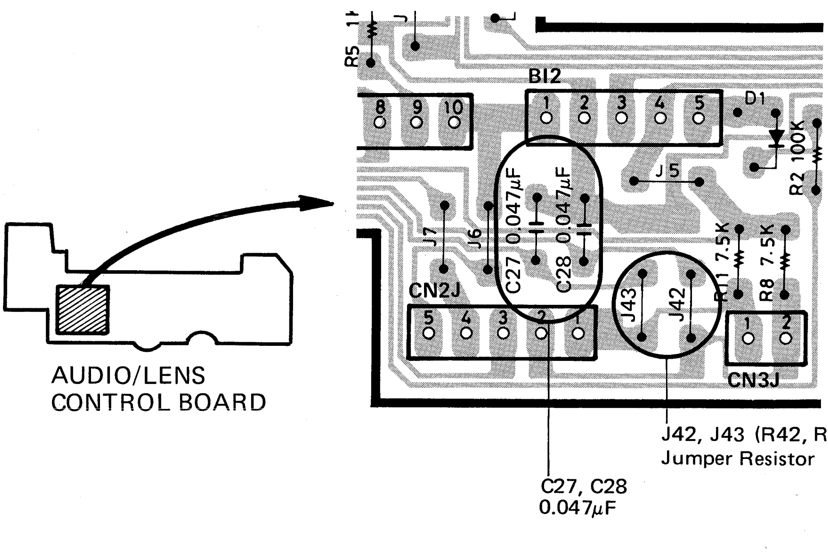
Service Manual

Colour Video Cameras
WVP-200E/WVP-200N

Supplement-2

- Resistors, R42, R43 and capacitors, C27, C28 have been changed to shorter the time constant for prevention of audio noise and screen noise when the optional lens WV-LZ09/12E is used with camera.
- This modification is applied from serial No. 38A00001 and higher.
- Please file this supplement service manual with the service manual order No. VKD83070768C8.


ZOOM CONTROL
+7.6V(P.B)
7.6
7.6
Q1
Q3
7.2
7.2
R10 10K
R9 10K
R8 7.5K
R11 7.5K
Q2
Q4
7.6
7.6
C28 0.047 µF
C27 0.047 µF
Q1,Q4 ZOOM CONTROL (TELE)
Q2,Q3 ZOOM CONTROL (WIDE)
C27, C28 0.047µF


AUDIO/LENS CONTROL BOARD
R5
BI2
D1
R2 100K
J5
J7
J6
C27 0.047µF
C28 0.047µF
R11 7.5K
R8 7.5K
CN2J
J43
J42
CN3J
J42, J43 (R42, R43) Jumper Resistor
C27, C28 0.047µF

REPLACEMENT PARTS LIST

SYMBOL NO.	PART NO.	DESCRIPTION
	AUDIO/LENS CONTROL BOARD	
J42	ERJ8GCSJOR00	Jumper Resistor
J43	ERJ8GCSJOR00	Jumper Resistor
C27	YF426473XKS	Ceramic 0.047µF 50V
C28	YF426473XKS	Ceramic 0.047µF 50V

National/Panasonic

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Printed in Japan
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